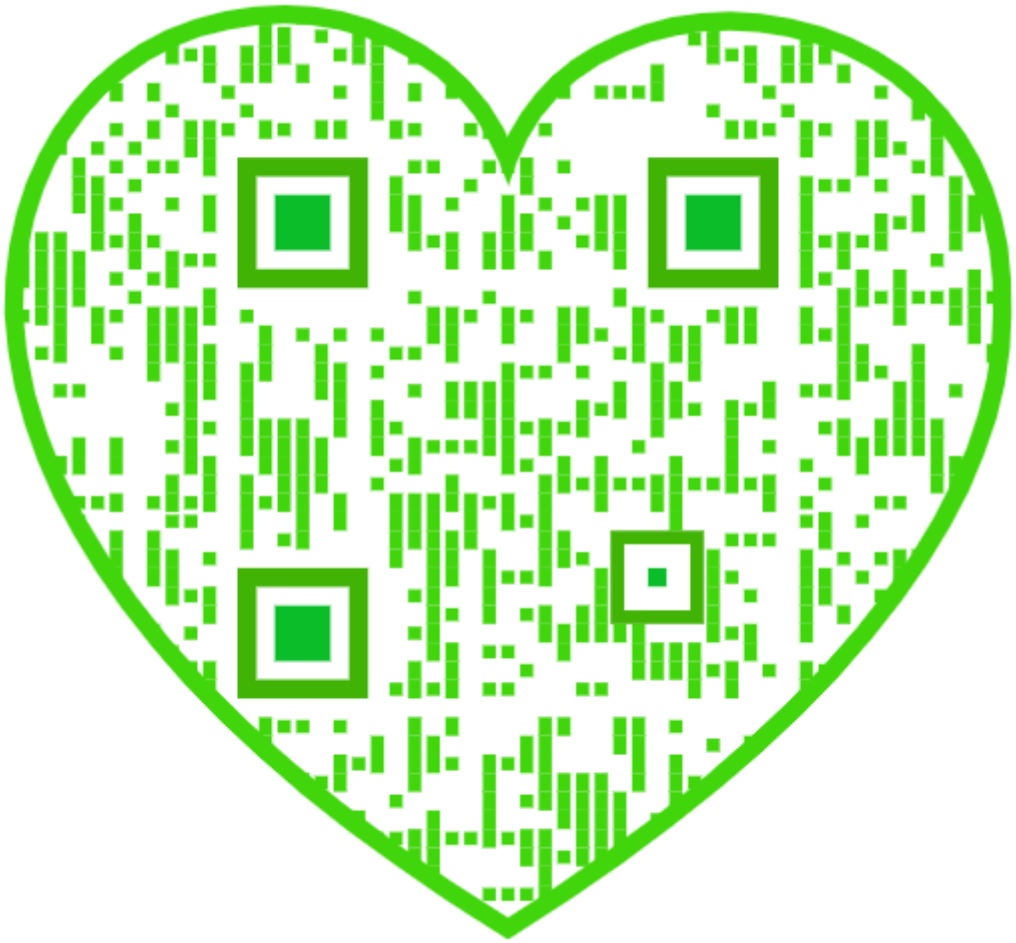

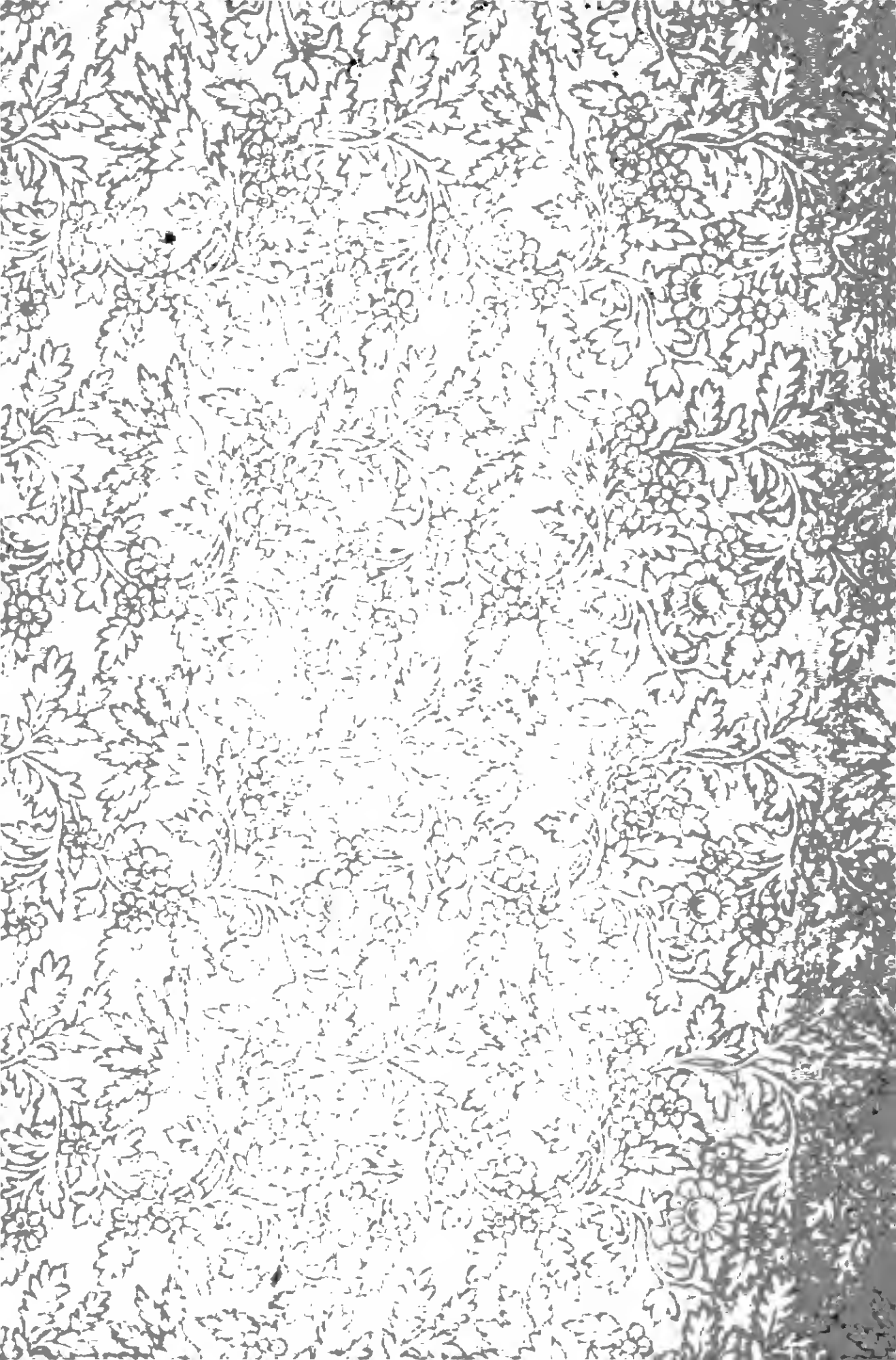

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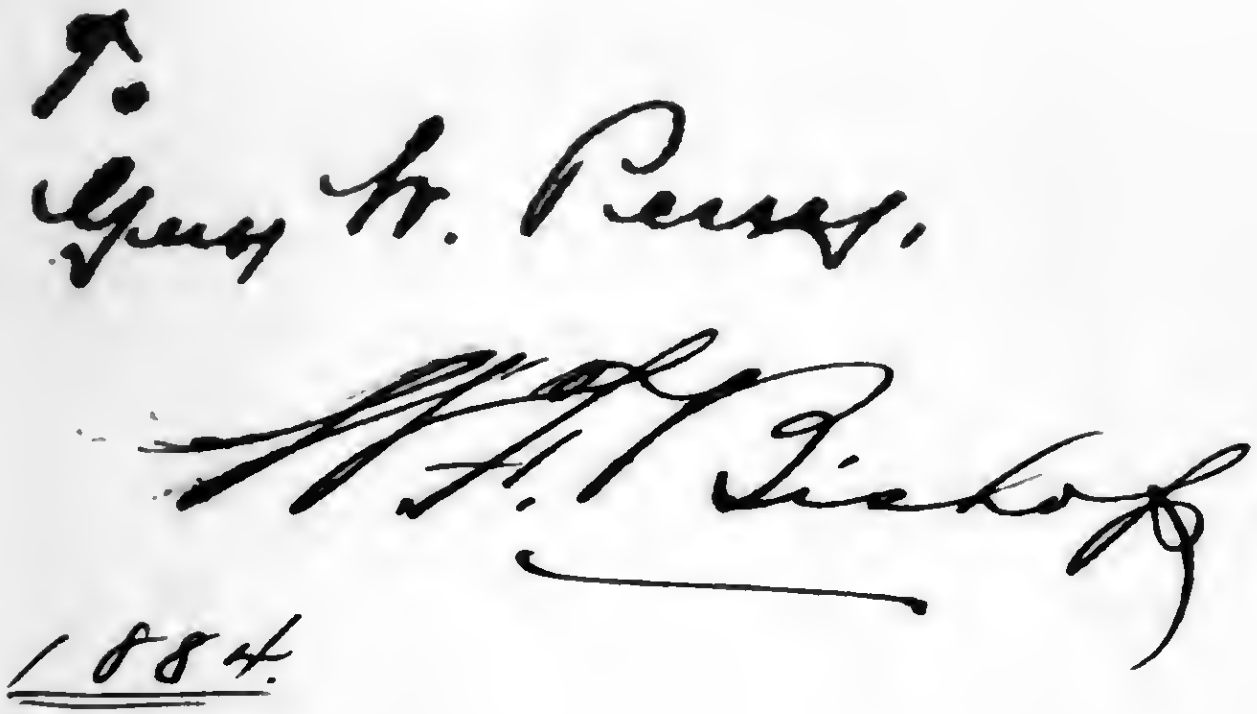

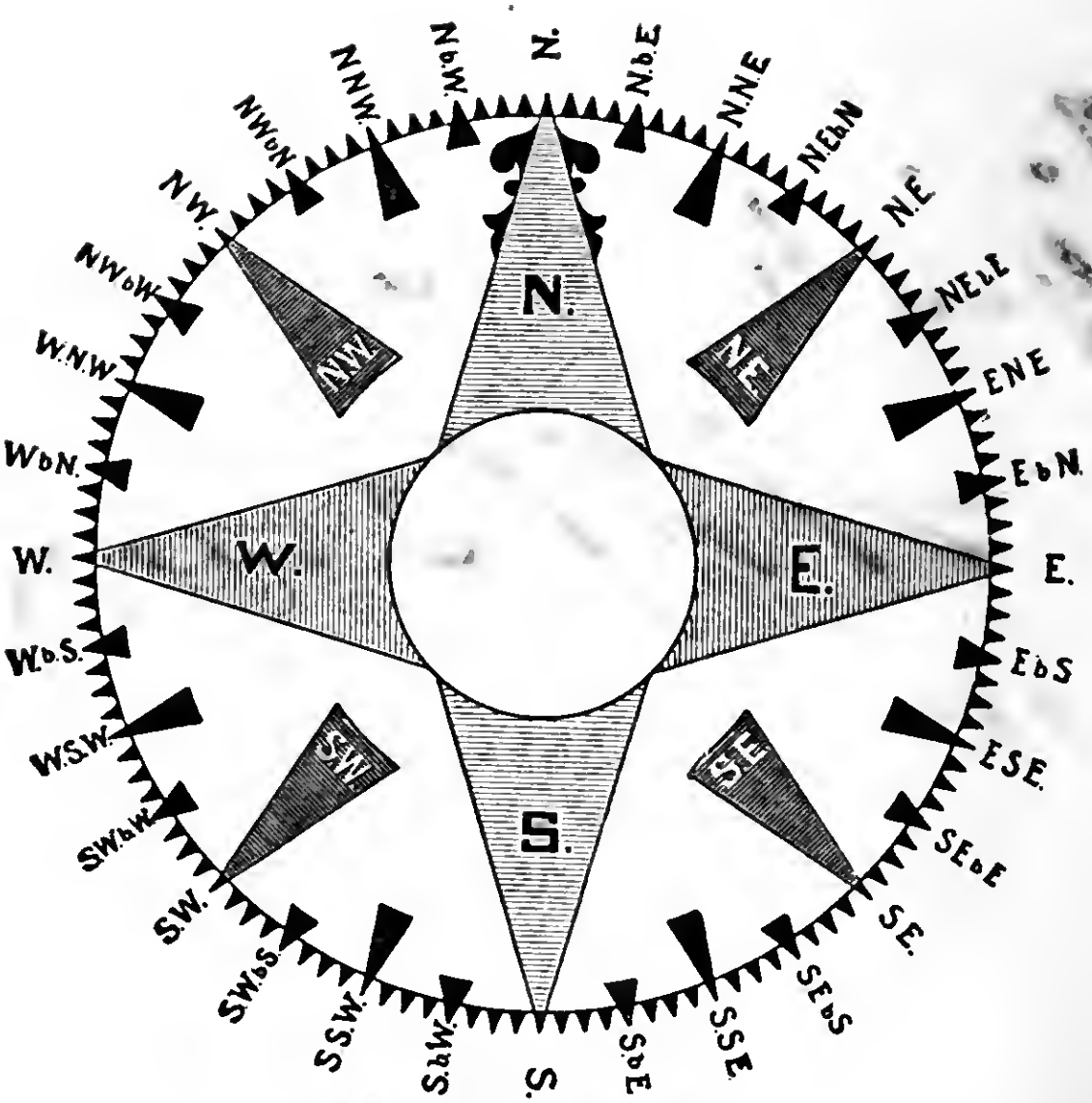

MARINERS COMPASS.

PRACTICAL

BOAT-SAILING:

A Concise and Simple Treatise

ON

THE MANAGEMENT OF SMALL BOATS AND YACHTS UNDER ALL CONDITIONS, WITH EXPLANATORY CHAPTERS ON ORDINARY SEA-MANŒUVRES, AND THE USE OF SAILS, HELM, AND ANCHOR, AND ADVICE AS TO WHAT IS PROPER TO BE DONE IN DIFFERENT EMERGENCIES;

SUPPLEMENTED BY A SHORT

VOCABULARY OF NAUTICAL TERMS.

BY

DOUGLAS FRAZAR,

FORMERLY FOURTH OFFICER OF THE STEAMSHIP "ATLANTIC," MASTER OF THE BARK "MARYLAND," AND COMMANDER OF THE YACHT "FENIMORE COOPER" IN THE NORTHERN SEAS OF CHINA AND JAPAN.

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PREFACE.

THIS little work is not written to teach any thing new to those who know how to sail boats well and safely, but only for the purpose of enabling any person, after a perusal of its pages, to feel confident of handling a boat so as to be *perfectly safe*, and to have some knowledge of the rules which should govern its movements under all conditions that might naturally arise. This sport is far less dangerous than is supposed; and it may even be asserted that no kind of amusement is safer during the summer months in these latitudes, — many not as safe. Some one has truly said "that the boat is always under the perfect control, and subject to the will, of its master; whilst in driving, for instance, one is dependent for life and limb upon the forbearance, good-temper, and training of a brute whose strength is greater than one's own, and whose over-vaunted intelligence is often exceeded by his obstinacy."

It is simply wonderful what stress of wind and sea a small boat will sustain *with perfect safety* when properly managed.

It is hoped that the following pages will be sufficient to post all tyros in the *technique* of the science, and enable them to execute all the manœuvres that are needful, and to know the names and uses of all the important ropes, sails, &c.; *so that they will not have to ask anybody any questions*, and be able to "paddle their own canoe."

If the author has succeeded in making himself understood, so that the student will feel competent to take charge of his own boat or yacht with confidence, he will be amply repaid.

There is no doubt but what there may be a difference of opinion amongst yachtsmen and boatmen as to the best manner of executing many sea-evolutions. The author has chosen those which have stood the test of time, and are comparatively simple, and easy of execution, fitted for small craft, and perfectly safe.

Several useful hints have been gathered by an inspection of Bowditch's "Epitome" and Brady's "Kedge-Anchor."

MOTHER GOOSE (*slightly altered*).

"Three wise men of Gotham
Went to sea in a bowl:
If their wits had been stronger,
My song had been longer."

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PRACTICAL BOAT-SAILING.

CHAPTER I.

THE MODEL, RIG, AND NAMES OF THE SAILS AND ROPES IN COMMON USE.

It would be beyond the province or scope of this work to enumerate all the different models and peculiarities of the numerous crafts and rigs that are used to navigate the waters, both in civilized and uncivilized countries; and we must content ourselves by taking into consideration a few of the most pronounced types that are now in vogue, and explaining their principles as briefly as possible.

Local prejudices rule strong in all parts of the world; and the rig, size, and model of a boat, are almost always defined by the "custom" of the waters in which it is to be sailed: still it is perhaps well to give a few general rules for the selection of a boat. For bays, sounds, harbors, and inland tidal waters connected with the sea, the

boat or small yacht should be of a shoal model, and what is termed the centre-board principle, and usually the sloop or cat-boat rig.

For ponds, and small lakes of fresh water, the boat should always be of good beam, light draught, and small sail, on account of the frequency of puffs of winds from unexpected quarters from the neighboring hillsides. In fact, if there is any danger in sailing, it is upon these land-locked ponds or lakes, where more seamanship is often needed than on the larger bays and sounds of the ocean itself.

For outside work, or in places where the tidal currents are strong, or the wind may sweep across the water for miles, "kicking up a sea," the deep keel model, with schooner or cutter rig, will be the better boat; this class being considered superior in working to windward in a heavy sea to the shoaler craft. But, even on this question, there are disagreements; and you shall hear of those who maintain that the shoal-water centre-board craft is the better boat in a heavy sea-way; and some lovers of a craft called a "sharpie" tell startling tales of its endurance in heavy weather, although it is the shoalest of all shoal boats. The advantage of the centre-board boat over the keel boat for harbor and sound sailing, or wherever the tide rises and falls to any great extent, is obvious. With the latter, one is liable to be brought up upon an unknown sand-bank or ledge, and compelled to

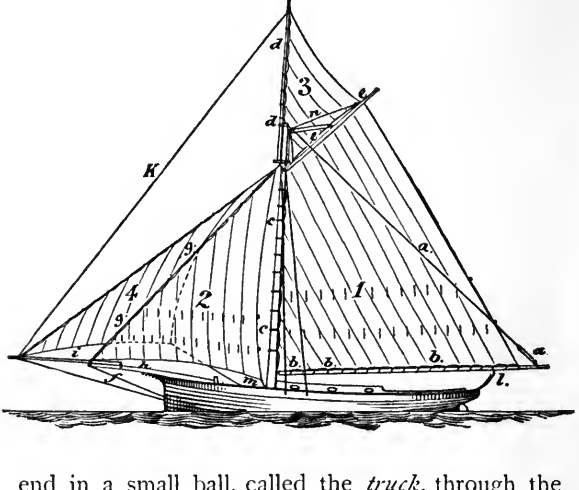
remain, sometimes for hours, till floated off; whilst with the centre-board, upon touching any danger or shoal, the board is hauled up, and the boat that a moment before drew, perhaps, six feet of water, now draws but one foot, allowing one to "go about," or steer to one side, and avoid the obstacle, and get home in time for supper. In short, in the opinion of the writer, it is only for outside use, and for a larger class of vessels than this book will treat of, that the keel boat is needed.

To avoid repetition, and to condense as much as possible, so as to be useful to all for practicable purposes, what is termed the *sloop-rig* — one quite as frequently used as any other for small boats — is presented in the accompanying diagram. This will be described as briefly as possible consistent with a thorough explanation of the sails, ropes, &c., and their different names and uses; it being, of course, understood that the management of a sloop in a seamanlike manner carries with it the knowledge of managing a yacht of any rig, the principle applying equally to all; and to describe the "staying," "wearing," and absolute management of each sail and rope of each separate rig, would be unnecessary, and extend this little work to a greater length than is desirable. The best that can be done is to take a type, and, having made that familiar, the whole science of boat-sailing will have been acquired.

The sloop-rig consists of the following-named spars: —

The *mainmast* (c c), which is usually placed at about two-thirds of the boat's length from the stern. This spar serves to sustain the *mainsail* (1) by a series of hoops which encircle it.

The *main topmast* (d d), which is fitted to the head of the *mainmast*, and terminates at its upper



end in a small ball, called the *truck*, through the sides of which are fitted little *sheaves* (i.e., wheels), by means of which, and the use of a small-sized rope, called *signal-halliards*, the flag, or private signal of the boat, is hoisted to the *topmast's* head, and displayed.

This spar also serves to sustain the *gaff-topsail*

(3), which is hoisted and lowered along its length by a series of hoops encircling the spar. This sail, as a rule, is set and furled from the *top*.

The *bowsprit* (h), which projects from the bow of the boat, and serves to support the *mainmast* by means of a stay (g g) leading from its outer end to the *mainmast* head, and another stay, called the *bobstay* (f), to the prow of the boat. The *jib-stay* (g g) serves to hoist and set the *jib* (2) upon, —the most important sail, after the mainsail.

The *jib-boom* (i), which extends out beyond the *bowsprit*, its heel being made fast to the latter, and, by means of stays, supports the *mainmast* and *maintopmast;* and upon the inner one of these is hoisted and set the outer or *flying jib* (4), the other (k) supporting the *maintopmast*, and called the *maintopmast stay.*

The *main-gaff* (e e), which sustains and stretches the *head* of the *mainsail*, which is securely lashed to it by means of small seizings, or lashings.

The *main-boom* (b b), which receives and stretches the *foot* of the mainsail, to which it is securely lashed.

The above constitute the main spars and sails of a boat of the sloop rig.

To enable one to understand all that follows, it will be necessary to acquire a little more information concerning these spars and sails, and the names and uses of the principal ropes, sheets, &c.

As the reader faces the cut, and glances at the *mainsail* (1), he should remember that the *head* of the sail is that part fastened to the *gaff;* and the *foot*, that part of the sail fastened to the *boom*. The *outer-leach*, or *after-leach*, that part of the sail which extends from the end of the *gaff* to the end of the *boom* farthest removed from the mainmast. The *inner-leach*, or *luff*, is that part of the sail which extends from the *gaff* to the *boom*, and is confined to the *mainmast* by hoops that embrace it, and allow of the sail being hoisted and lowered at will.

The *clews* of a sail are those parts which a "landlubber" might call corners; i.e., the clews of the mainsail are four, and are situated at the junction of the *luff* and *head* of the sail, the *outer-leach* and head of the sail, the *outer-leach* and foot of the sail, and the *luff* and *foot* of the sail; the latter being also called the *tack*.

The mainsail, as will be observed, has also a series of regular lines crossing its surface. These are called *reef-points*, and consist of short, dangling pieces of small rope, sewed into the sail, and hanging down on either side, long enough, when the sail is lowered, to be fastened around the main-boom, and thus tie down the sail, making it smaller for rough weather, which is called "reefing." On the *outer-leach*, at the end of these rows of *reef-points*, are placed little iron rings, or *cringles*, as

they are called, which are used to pass a rope through, called a *reef-pennant*, to haul the sail well out on to the boom when being reefed. The rope (a a) represents what is called the *topping-lift*, and is used to lower or hoist the *main-boom*, so as to make the sail set well in certain circumstances; or when the *main-boom* is out over the water on one side of the boat, when running before the wind, to "*top it up*," so as to keep it out of the water when the boat rolls. It is set up by means of a small pulley, the end of the rope coming inboard through a sheave in the boom, or one fastened to its side.

The *jib* has its *luff*, *head*, *foot*, and *after-leach*, the same as the *mainsail*, but, of course, has only *three clews*, being a triangular sail.

And what is defined about these sails will apply to all fore and aft sails.

The most important ropes, to which the attention of the reader is called, are the following: —

The *mainsheet* (l) is a long rope fastened to the main-boom, and controlling the action of the mainsail. According to the size of the boat, this sheet will be single, or rove through a series of blocks, to enable the helmsman to handle the sail. Upon the management of this sheet depends, in a great measure, the safety of all boat-sailing. Its perfect handling and adjustment call for the nicest skill; for its slightest movement changes the whole face of the canvas spread in the mainsail.

The *jib-sheets* (m) are fastened to the after-*clew* of the jib at the foot of the sail, and are led aft on both sides of the deck, so as to be within reach of the helmsman, or those sitting in the after-part of the boat. Like the *mainsheet,* they are used to confine and trim down the *jib,* each being used on the side on which it is desired to trim down the sail.

The *outer-jib* is controlled in the same manner, by two sheets, one being led aft on either side of the deck.

The *mainsail* is hoisted by means of two sets of ropes, called *throat* and *peak halliards* (n).

These are fastened at the foot of the mast to *cleats* when the sail is hoisted; the throat-halliards, usually on the port-side of the mast, and the peak-halliards, on the starboard side of the mast.

N.B. — The term *starboard* is applied to any thing appertaining to the right-hand side of a boat, with the observer looking towards the bow. The term *port* (formerly, and sometimes now, called *larboard*) is applied to any thing appertaining to the left-hand side, and, thus once defined, never changes.

Although the observer may go forward and look aft, the starboard side is still the starboard side, although now on his left hand. Hence sailors talk of the *starboard* anchor, the *port* shrouds; "Ease off the *port* jib-sheet!" "Let go the *starboard* flying-jib-sheet!" "Put your helm over to *port!*" "Hoist those colors from the *starboard* side!" "Let the boom go over to *port!*" "Get up that anchor

which you will find below in the forecastle, on the *starboard side!*" "Go about on the *port* tack!" &c.

The *jib* (2) is hoisted by means of a rope, which is called the *jib-halliards*, which is made fast to the upper clew of the sail, and led through a block at the *mainmast* head, and thence to the deck, being "belayed" (i.e., made fast) to the mainmast near the deck. This sail also has a small but useful rope attached to it, called the *down-haul*, which is fastened to the upper clew, and led down to a small block at the bowsprit end, and thence in on deck; and serves to haul the sail down after the halliards have been cast off. The *flying-jib* (4) is fitted with *halliards* and *down-haul* in the same manner.

The *gaff-topsail* (3) is set by hauling out the *after-leach* and *foot* to the end of the *main-gaff*, which part of the gaff is called the *peak*, by means of a rope, which is named the *gaff topsail-sheet*, which reefs through a sheave in the *gaff* end, and hence under the *gaff* to the throat, and thence through a block to the deck. The other *clew*, formed by the *luff* and foot, is stretched by means of a rope leading to the deck, called the *tack;* and the sail is hoisted by means of *halliards*, that reve through a block fastened at the *topmast* head, and thence leading to the deck.

When the boat is under way, and pressed over by the wind, the terms "starboard" and "port" are

often exchanged for "leeward" and "windward," and, in fact, are the more commonly used in many instances; although an old sailor would apply the word "starboard" to certain things that he would not apply the word "leeward" or "windward" to: but these exceptions it would be hard to point out, and they would be of little material use. Let it suffice to say, that as a rule, when a boat is at anchor or upright, the terms "starboard" and "port" are used; whilst, when under way, the terms "lee" or "leeward," "weather" or "windward," are more commonly used; for instance, "Let go the weather jib-sheet!" "Haul aft the lee flying jib-sheet!" "Haul that coil of rope over to the weather-side (or to windward)!" "Throw that hot water to leeward!" "Does she carry a weather-helm?" &c.

CHAPTER II.

Ballast. — Useful Knots. — To anchor in a Gale of Wind. — Getting the Anchor, and Casting. — Anchoring for Fishing. — Grounding and Floating. — Warping by Means of an Anchor. — To make a Running Moor.

HAVING learned the names of all the important spars, sails, and ropes, and their uses, it becomes necessary to study the other appurtenances of a boat to acquire a thorough knowledge of boat-sailing; and for that purpose we will pass briefly in review the following.

BALLAST.

Nearly all yachts are made of such a model as to need some heavy material placed within them to enable them to carry sail, and stand up against sudden squalls and flaws of wind. This material is called *ballast*, and, as a self-evident rule, yachts that are shallow, and of great breadth of beam, need less than those of a deep and narrow model.

Many articles may be used for ballast, and a yacht ballasted in many different ways; but the

following named are those that are most commonly used. Pig-iron, in pieces that can be handled, is a favorite kind of ballast: sometimes each piece is painted, so as to preserve it from rusting, and discoloring the inside of the boat. Iron in the form of fifty-six-pound weights is also used; whilst a cheaper and very common ballast is found in the small clean pebbles of the seashore. Water contained in movable tanks has been at times, with some, a well-praised ballast; and in yachts where it can be used, and that are fitted for it, it is of great practical value, as, like no other, it can be discharged and renewed by means of a pump, according to the will and weather.

The slag from smelted copper and iron is extensively used, as are also broken pieces of iron-casting. But perhaps the ballast as commonly in use as any other in medium-sized yachts and small boats, or, at least, a part of the ballast, consists of common sea-sand enclosed in canvas sacks of a not too unwieldy size, that are movable about the bottom of the boat by means of canvas handles, and can, in emergency, be dumped bodily over into the sea, thus relieving the yacht of so much dead weight.

Nearly all yachts that are ballasted, when filled with water, will sink; and there have been many ingenious ways devised to prevent this, so that, in case a yacht should be swamped, i.e., completely filled with water, she would yet float, and

make a sort of life-preserver to the occupants, and not go to the bottom, and leave them struggling on the surface.

A very ingenious and yet cheap way of obtaining this result is to have built into the wings of the yacht, under the floorings, and in every conceivable place that is out of the way, empty tin or iron six-pound powder-canisters, that seal hermetically, sufficient in number to overcome, by the air they contain and the natural buoyancy of the wood composing the yacht, the weight of the ballast, or the tendency of the same to sink the yacht when filled with water. It will not take a great number of these canisters in quite a large yacht of medium model; for, although the yacht will sink without them, it does not take very much of this confined air to turn the scale, and make it float.

Some yachts are ballasted with lead; and this, if it were not for its cost, is a prime ballast, taking up less space than any other. And some care not for the first cost; for, as is truly said, it is a marketable article, which does not vary much in price: and, even if it should cost quite a sum to ballast one's yacht with lead, it is so much cash on hand, and can always be taken out and sold at a moment's notice. Besides the different kinds of ballast that have been enumerated, there is also the living ballast, that is to say, human beings, whom one can place in different parts of the yacht to trim her

in different situations. But this kind of ballast is mostly used in racing, and even then is sometimes apt to "get out of order," and not "work well;" and the writer would advise one to stick to iron, lead, gravel, or sand as superior.

Perhaps for bay and harbor sailing and short cruises from port to port, there is nothing better than the canvas bags of sand, which can be emptied, if necessary, when one gets aground, or in any other case of emergency, and filled again at the very next shore upon which one lands in the little tender.

As a rule, sailing-boats and small yachts are "trimmed by the stern;" that is, the bow is slightly elevated from the water, the boat being pressed, by the position of its ballast, deeper into the water at the stern than at the bow. But every yacht is a law to itself; and no rule will do for all. The position of the ballast has also much to do with the steering qualities, as well as affecting speed: if it be placed too far forward, the yacht will "yaw," and at times, before the wind, be almost unmanageable. In "going about," also, if the ballast be too far forward, the boat will often "miss stays;" that is, fail to perform the evolution of getting upon the other tack.

Misplaced ballast will also cause the yacht to carry the helm in a bad position, stopping her speed. Bringing a yacht "by the head" with too

much ballast is a serious, nay, at times, a dangerous fault. Bringing her too much by the stern, by means of ballast, is not so grave a matter: the yacht may lose in speed, and not be in her best trim; but she is not as dangerous or unmanageable. It is always better to have too much ballast than too little. It is very easy to ballast a boat with sand or pebbles before one starts; but they cannot be obtained after having once gotten under way; and from this simple cause have arisen so many disasters that need never have occurred! One's natural pride, and the desire to sail fast, prevent often the taking on board of the necessary amount; and then, when it suddenly comes on to blow, the yacht is found to be crank, perhaps dangerously so. How much better would it be to have a little too much ballast, which, when homeward bound, — if there is need of haste, and the weather be settled, — can be discharged over the side, increasing her speed!

It is only by careful study that one can ascertain just the amount of ballast that is needed; but, once found, do not change it for light or heavy weather, but keep it intact, and you and your boat will soon understand each other much better than will be the case if it be continually changed. A happy medium is what must be sought for in the question of ballast; for, of course, in different weathers different amounts would be in order. But be advised, and be on the safe side: have plenty of ballast, if

the speed is not the very fastest that the boat is capable of making.

Professional boatmen, lobstermen, and fishermen are never eternally shifting and changing their ballast: having found the "happy medium," they let it alone for the season. It is only the amateur that is continually sailing his yacht upon her "beam-ends," or watching with the utmost anxiety the fast approaching squall, for which the professional cares naught.

KNOTS.

We cannot get along on board of a yacht without knowing how to make a few useful knots.

The great beauty of a knot, in a sailor's estimation, is not only to hold well, but to be easily *untied or cast off* after having been subjected to a great strain. Of all knots the bowline is, perhaps, the king, because it can be submitted to a strain that will part the rope, before slipping or giving in the least (and this holds true of the largest hawser, as well as the smallest line); and, after this strain is removed, it can be untied as easily as a knot in one's summer neck-tie. It can be very quickly made, and is useful in more situations than any other, and can be used to replace many others. It is used to fasten a rope in a hurry to the ring of an anchor, or to make fast the painter of a tender through a ring-bolt securely for towing, and yet so as to be easily cast off; fastening sinkers upon fish-lines, or

the end of any rope in a position where it will bear strain. Flags may be bent on with this knot, although sailors have a signal-halliard knot, as they also have a peculiar bent for fastening a hawser to an anchor; but no knot can be used in an emergency, in place of all these, like the bowline; and, if one can have knowledge of but a few, let the bowline be the first acquired. It will be useful also on shore, and throughout one's life, making as a matter of past record, to be eternally sunk in oblivion, those awful knots that never would come undone again. Next to the bowline in importance is, perhaps, the bend called *two half-hitches*, or the *clove hitch*, by means of which one can secure with the end of a rope almost any thing. This hitch is called two half-hitches when it is made upon its own standing part, and a clove hitch when made around any other thing, such as a spar; but both are the same in principle.

The third knot that must be acquired is what is called the *square knot*, or reef knot, and is used in reefing the sails. The reef-points being tied in square knots can be easily untied when needed: if improperly tied in a *granny knot*, they either jam or fly open in the height of the gale, — when one desires them most to hold on.

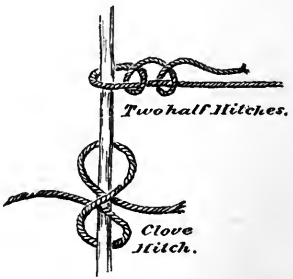
With these three knots one can get along nicely, and it is advisable to obtain a knowledge of how to make them without delay.

TO MAKE A BOWLINE KNOT.

Take the end of the rope in your right hand, and the standing part in your left; lay the end over the standing part; then with your left hand turn the bight of the standing part from you, and over the end part, by a peculiar turn of the wrists, which comes only by practice, forming what is called a goose-neck on the standing part; then lead the end, which is already enclosed in the goose-neck, under and around the standing part, and down through the same goose-neck; and haul the parts taut.

TO MAKE TWO HALF-HITCHES.

Pass the end of the rope around the standing part, and up through the bight (this is one half-hitch); pass the end again around the standing part, and up through its own bight, which makes the second half-hitch, and completes the knot. (See diagram.) Then, if this knot is used to bend on a hawser to an



anchor, it is customary to stop the end of the rope down upon the standing part by means of a rope-yarn, so as to prevent all chance of its coming apart whilst chafing about at the bottom of the sea. *A clove hitch* is this same knot made around a spar or other article, instead of on its own standing part. (See diagram.)

TO MAKE A SQUARE OR REEF KNOT.

First make a common overhand knot around a spar, or any thing that may suit; then make exactly the same knot again, taking care to cross the ends so that they will each come out on the same side of the bight as they did in the first knot. If on either side of what may be called the right or left side of the knot, as seen in the cut, the ends do not come out in the same relative place as in the first knot, it is called a "granny knot," and will not hold. And one who makes a "granny" becomes the laughing-stock of all on board, and is at once pronounced a "land-lubber," if he cannot make this simple and useful knot correctly. So be advised, and learn it at once.

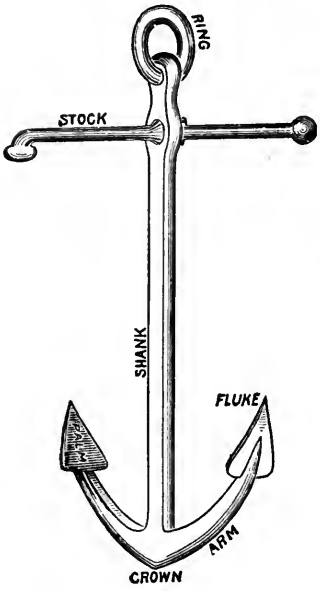
Square or Reef Knot

THE ANCHOR AND GEAR.

Nothing on board the yacht, after the sails and ropes, should receive such attention as the "ground tackle," as it is called. On the anchor and its ap-

purtenances rests the safety, often, of all on board; and yet there is nothing so often neglected, or left carelessly out of order, or the cable in a snarl, as the anchoring gear in a small yacht.

Every yacht over twenty-five feet in length should be fitted with three anchors, or, at the very least, two. If three in number, two of them should be nearly of the same size, and one quite small and handy, which is called the "kedge-anchor." We will suppose that the yacht is fitted with three, and, if so, their uses will be as hereinafter described.



In the olden times hemp cables were wholly used, even for vessels of large size and men-of-war; but in these latter days they have been replaced by iron cables in large ships, and by manila hawsers in small yachts. To be sure there are some advantages

in favor of a chain-cable for even small yachts; but as a rule the pliable, soft but strong manila rope is the favorite. Small iron cables are, for some reason or other, distrusted; and they are also heavy to get back again, even if of small size, when the yacht is anchored in many fathoms of water. They are useful when the yacht is likely to lie at anchor in a sea-way for a long time, for then they would not chafe; whilst a manila cable might become seriously injured. Some use a few fathoms of iron chain, and then manila above that, so as to keep the end near the anchor from fraying on rocky bottoms. It is to be remembered, then, in a long piece of chain cable, that the *one imperfect link*, or one that is weak in any way, *determines the utmost strength of the cable*. In other words, the strain necessary to part the weakest link makes the stronger ones useless. Perhaps it is the fear of this weakness lurking in some unknown link that deters yachtsmen, as a class, from using chain-cables, and makes them prefer the clean, handsome manila rope, that they know is just as strong at one part as another throughout its entire length.

Wire cables have commenced to be talked of, made in the same shape as wire rigging, only more pliable; and these, perhaps, will, in time, come into use, as they are of uniform strength, and take up less room than the cumbersome manila rope cables.

If the anchors are stowed below deck, always get

them up, and bent on to their respective cables, long before the time when it becomes necessary to use them. One never knows, near a coast-line, when an anchor may be needed.

Always have good long cables, and not nasty little pieces of short rope: on this depends often the safety of all concerned. Every thing else being equal, the length of the cables is what will determine, in a gale of wind, whether the yacht goes on shore a wreck, or gallantly and safely weathers the storm.

TO ANCHOR IN A GALE OF WIND.

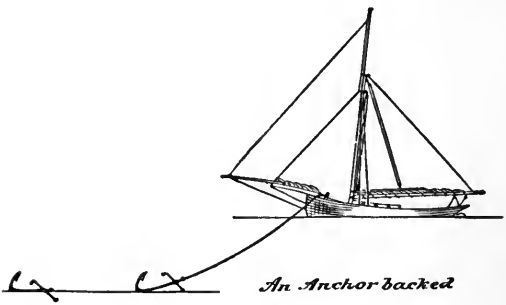
If caught in a gale of wind on a lee-shore, and with no chance of escape, — the sea being too heavy to "claw off" to windward, and no harbor to leeward, — the only safety is to anchor; and always do this before it is too late, and before the yacht has been driven too near the shore or breakers to lie quietly. Procrastination at such a time is often highly dangerous; and a yacht may go ashore because she is anchored in a line of heavy breakers, when just outside she would lie almost with ease.

It will be found, also, that it *always* takes longer to get an anchor down than was estimated, and whilst it is being done the yacht sets heavily in towards the shore with each sea: therefore anchor *early*. When every thing is ready, bring the yacht to the wind, and let the sails shake in the wind's

eye; and, so soon as she gets stem-way, let go the best bower anchor, taking care not to snub her too quickly, but to let considerable of the cable run out before checking her; then take a turn or two around the knight-heads, long before there is any strain, and be ready to give her cable gradually as she needs it. One must be very careful to get this turn around the knight-heads long before there is any strain; for the strength of the yacht drifting before the gale will be under-estimated, except by a sailor; and if one has neglected to take the necessary turn in time, and a strain once commences upon the cable, it will then be too late, and the mortification will be experienced of seeing the whole cable go overboard, unless the yacht be brought up by its being fastened below; and even then the chances are, that it will be snapped asunder by the momentum that the drifting yacht has acquired.

Just so soon as the first anchor bites, and the yacht seems to come head to wind, and hold, let go the second anchor, and pay out plenty of cable on both, keeping the strain as nearly equal on each as possible. In grave circumstances like these of anchoring in a gale of wind on a lee-shore, it is always well to put down both anchors. Too often one anchor is used, because the weather does not look very bad, and, as it increases, the cable is paid out upon; and when, at last, it is ascertained

that the gale has increased, and another anchor is needed, it is found, after it is cast, that the cable cannot be paid out upon it, because the end of the cable of the first anchor is close at hand, and has been nearly all paid out, making the second anchor useless. Always let go both anchors, one shortly after the other; and if the weather be very bad indeed, then, when about half the cable is paid out on the second anchor, lash to the cable the



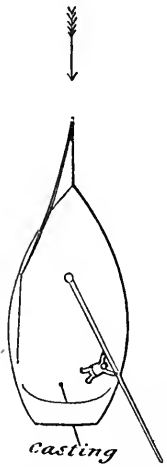
An Anchor backed

small kedge-anchor, by fastening it by small ropes, passed around the shank and through the ring, to the cable of the large anchor, and cast it over the bows. This is called "backing an anchor" (see diagram), and strengthens the hold of the first anchor in a marked degree, especially if the holding-ground be poor. It is supposed, of course, that, as the yacht comes head to wind, the jib is hauled down; and now the next thing is to down

mainsail, and furl every thing snug. If the yacht holds well, keep part of the cables still on board, to pay out, if necessary; and, to be sure that she is not dragging, cast a hand-lead over the side, and let it rest on the bottom. Make it fast, leaving enough slack so that the yacht may sheer without moving it. By trying this once in a while, it will be instantly seen, from its relative position between the yacht and the bottom, whether the vessel has dragged. For instance, if the lead-line should be left up and down, and the next time it was tested should be found resting on the bottom, toward the bow of the yacht, she would have dragged just that distance, and needs more cable at once. It is well always to give a good scope in such emergencies, and allow the anchors to become embedded at a good angle, and not be played with by just holding, and then dragging a little, and then paying out a little: that is dangerous sport. After all is furled snug, nothing else can be done for safety, except in case of extreme emergency, when, as a last recourse, the mainmast may be cut away if the yacht is dragging on shore. But with two good anchors down in, say, six fathoms of water, and one of those backed, and forty or fifty fathoms of cable out, it will take a terrific sea and wind to make a yacht budge an inch.

GETTING THE ANCHOR, AND CASTING.

Hoist the mainsail, and take the gaskets off the jib, and see that the downhaul is cast off, and is clear for hoisting; then heave away on the cable, either by hand, or by windlass, if the yacht be large enough to need one, till the anchor is almost broken out of the ground, or what sailors call, the cable, "up and down;" then, by means of the rudder, if in a tide-way, cast the head of the yacht in the direction you wish to proceed upon; trip the anchor; and run up the jib as soon as it will draw. If there is no tide-way to act upon the rudder, then, before breaking out the anchor, hoist the jib; and, if it is desired to cast the boat upon the port-tack, trim down the jib-sheet to port, and shove the main-boom well out over the starboard quarter, and, when the boat has a good sheer, trip the anchor; and, when she has paid off enough, let go the port jib-sheet, and trim down on the starboard-sheet, and haul aft the main-boom, and proceed on your way.



ANCHORING FOR FISHING.

It is often needful to drop an anchor so as just to hold the yacht stationary for a short time in some known place, for the purpose of fishing; and these places are almost always ledges of rock, which foul and entangle the anchor, and it is often difficult to weigh it again. To avoid this (if there is not too much wind, and the yacht will lie easily), instead of making the cable fast to the ring of the anchor, make it fast with a clove hitch around both arms at the crown, and lead it along the shank of the anchor to the ring, to which attach it by means of a small piece of spun yarn or twine that will hold some strain, but which can be broken in case of necessity. Then, when it is desired to get under way again, and the anchor is found to be fouled, bring enough strain, by means of the windlass or otherwise, upon the cable to part the twine at the ring; when the strain will come directly upon the crown and flukes, and the anchor will almost always be cleared. If it should not be, pay out plenty of cable, and sail around or beyond it, and all at once it will be found that it is cleared, and can be weighed. In anchoring in this manner, it is not, in light weather, necessary to lower the mainsail, but simply to trim down the main-sheet flat, or place the boom in a crotch made for that purpose. The jib can be lowered; and hoisted again when under way.

GROUNDING AND FLOATING.

If the yacht takes the ground on any shoal, and is left by the tide, it is always proper to get out an anchor in the direction of the wind, before the tide returns; then, when the water begins to make, the yacht will not be blown higher and higher upon the shoal as she commences to float, but will be held by her anchor, and soon ride head to wind or tide.

WARPING BY MEANS OF AN ANCHOR.

There are times when it is desirable to get a yacht into a certain position, and there is no wind. To do this, run out a light anchor to the spot you desire to reach, by means of a small tender; cast it overboard; and warp the yacht up to it: repeat this till the desired position is reached.

A RUNNING MOOR

Is sometimes made by casting an anchor, with plenty of scope of cable, whilst a yacht is running free, or before the wind, and bringing her with a long sweep, up to and heading the wind, when another anchor is let go also, and part of the cable of the first anchor hauled in so that she will lie to one anchor on the flood-tide, and the other on the ebb-tide.

CHAPTER III.

The Helm and Rudder. — Sheets. — The Topping-Lift. — Springing a Leak and the Use of the Pump. — Sailing "close-hauled," "by the wind," or "full and by." — To know when a Yacht is as near the Wind as she will lie. — Running free. — Before the Wind, or Scudding. — To execute a Pilot's Luff.

THE HELM AND RUDDER

Control the movement of the yacht through the water, and serve to direct her course.

The rudder may be described as pieces of boards or planks, in a line with the keel, hung upon pivots at the stern of a vessel, in an upright position, and extending from the keel to the rail, and having an attachment, called a tiller or wheel, to move it in either direction, to the right or left, across the line of the keel of the yacht. (See diagram.)

Rudder & Tiller

The tiller, which passes through the rudder-head, is moved to the right or left; and this is termed "moving the helm." For instance, "Move the helm over to starboard," "Put the helm to star-

board," that is to say, push the tiller over towards the starboard side of the yacht, which will carry the rudder to the port side of the yacht, and, if under way, the bow will change direction towards the left. In other words, when a vessel is under way, and going ahead by her own momentum, or anchored in a tide-way, the following rule always holds good : —

To starboard the helm carries the head to port.

To port the helm carries the head to starboard.

See diagrams, Figs. 1 and 2, page 37.

This is all reversed at a critical point in seamanship, which should be carefully remembered ; and that is when a yacht has what is called a *stern-board*, i.e., has received some force which is making her go through the water stern first. This often happens when an attempt has been made to tack, and the execution of the manœuvre has seemed to fail : it is then for a moment or two that the yacht will often drift astern, keeping in the wind's eye, making it uncertain whether or not she will yet "go about." It is at this moment, whilst she is making this stern-board, that a knowledge of the helm will yet put her about by shifting the helm hard over to the opposite side from where it was when the attempt was made to go about. Remember not to move the helm till the yacht has commenced making stern-way, then this law applies : —

To starboard the helm carries the head to starboard.

To port the helm carries the head to port.

For instance, if it were desired to go about by bringing the helm over to the starboard side of the yacht, and the manœuvre should fail, after the yacht has come head to wind, and commenced to get stern-way, it might yet be consummated by shifting the helm, or tiller, over to port, which would have exactly the same effect as it formerly had when the yacht was advancing, and the helm hard a starboard.

A yacht should be perfectly enough balanced with sails and ballast to carry a nearly even helm when on the wind: but it is often the case that they carry what is called a *lee-helm;* that is to say, when the yacht is on a wind, the tiller is continually poked down to leeward, or the opposite side of the yacht from the wind, to keep her up to her course, from which a tendency to fall off is shown: this is usually caused by too much head-sail, and may be remedied by a shorter bowsprit, a smaller jib, or another cloth on the after-leach of the mainsail.

To carry a lee-helm is a "beastly thing," as an Englishman would say, and something that cannot long be endured by those who truly like yachting.

If the yacht is free from the odious lee-helm, she may carry a *weather-helm*, which is not as bad as a lee-helm, but is troublesome. This causes the yacht to have a tendency to "luff up into the wind," and causes the tiller to be carried hard over on the weather-side of the yacht, and is usually occasioned by too much after-sail, or bad storage of ballast. Both these habits of carrying a lee, or weather helm, are detrimental to speed, as in both positions the rudder is often held at nearly a right angle to the keel, decreasing the speed materially. A yacht that is well balanced in sails and ballast will, on a wind, habitually carry the tiller a point or two to windward of the line of the keel, and it will need but little movement in any direction to keep her on her course. Sometimes, in sudden squalls, a yacht that carries a weather-helm will luff up into the wind in spite of the helm, so as not to be stopped except by slacking off the main-sheet. The same may occur in yawing with a yacht that carries a lee-helm. The helm may be put hard down, and sometimes the jib-sheet will have to be eased off, before the yacht will come to the wind. A weather-helm is endurable, but a lee-helm never, — "*Well, hardly ever.*"

SHEETS.

Sheets are the ropes that confine the mainsail and jib in place, and are most important in their uses. The jib-sheets lead along the deck, aft, to

the standing-room, in most yachts, and in heavy weather should not be belayed so but what they can be cast off in an instant by a sudden jerk of the hand. They may be held in place by a sort of hitch, hard to describe, where one part jams the other, and keeps it in place. Any boatman will explain how it is made. The main-sheet makes fast, usually, at or near the helmsman, under whose charge it is; *and in heavy weather this should not be made fast at all*, but only one turn taken, and the remainder of the strain rest upon the hand. Of course, in yachts over thirty to forty feet in length, with crews, every thing can be made fast: but we are now writing of smaller craft, and it is repeated, in squally and dirty weather *never make fast the main-sheet;* it is the key to the whole science of boat-sailing, and should never be out of one's hand in time of emergency. It can, after taking one turn, be wound around the tiller, and brought to the same hand as the one that is moving the helm, and yet be instantly cast off, if necessary.

THE TOPPING-LIFT.

This useful rope holds up the main-boom, and its length is regulated by a pulley. In scudding before the wind it is very useful; for, by means of the pulley, the end of the boom can be "topped up," so as to be kept out of the water when the yacht rolls heavily. It is also useful in making the

mainsail set well; and, after the latter is hoisted, it can be made to set flat as a board by slacking the topping-lift so that the after-leach of the sail will wholly sustain the outer end of the main-boom.

SPRINGING A LEAK, AND THE USE OF THE PUMP.

The pump should always be kept in good order, and ready for immediate use. In case the yacht springs a leak, the best way to stop it is to pass a light sail over the bows, and bring it aft over the leak by means of ropes on both sides of the yacht. Leaks are more easily stopped on the outside, the pressure of the water forcing the canvas into the damaged part; and even light canvas is almost water-proof. Of course, after once having thus temporarily stopped a leak, it is scarcely necessary to add that one should seek shelter in the nearest port, and have the yacht perfectly repaired before proceeding farther; for there is nothing more deceptive, or dangerous even, than a small leak, which is almost always sure to open, and become a source of great anxiety, just so soon as the sea begins to get up and the wind to blow, — at the very moment, in other words, when the yacht needs all possible care and attention in other directions, to insure her safety. Never neglect a small leak, but have it attended to and repaired at once.

Examine the well of the yacht often, and ascertain by personal inspection that she is not making

water faster than is usual, and especially have this attended to during rough weather. If a leak is discovered, the yacht should, if possible, be put before the wind till it is secured; for she will receive less strain to hull and spars in this position than in any other.

CLOSE-HAULED.

A yacht is said to be close-hauled, or sailing "*full and by*," when she is brought as near to the wind as is possible, so as to advance through the water; for it is to be presumed that it is understood, that if the main-boom were brought so as to pass directly over the line of the keel of the yacht, and the head of the yacht brought as near the wind as possible, and the sail to remain full, and not shake, she would not advance, but would simply be pushed to leeward by the wind. To insure her advancing, the boom must be at some angle from the line of the keel: therefore it may be taken as a rule that the main-boom, in sailing, is always kept out over the quarter, on one side or the other; and close-hauled simply means that it is brought as far inboard, or towards the line of the keel, by means of the main-sheet, as experience has proved can be done, and have her advance through the water. Some yachts haul aft the main-boom closer than others, being enabled to do so on account of their build and model; and the closer the boom can

be brought to the line of the keel, and the yacht still kept advancing, the nearer the wind she will be said to sail, and will "hold a good wind," as it is called. And this is, of course, a *desideratum* in beating to windward, or against the wind at an angle to it; for the yacht that makes the angle least between itself and the direction of the wind will, other things being equal, arrive the quickest at its destination; whilst another, that cannot lie so nigh the wind, will have to pass over much more water to arrive at the same place. On general principles, all fore-and-aft vessels lie equally near the wind, usually within four points and a half; but there are craft, that from their model, and equal balance of sail, or some other unknown cause, will lie nearer than their neighbors, and seem to eat up into the wind.

Just how far to have the main-boom over the side of the yacht, in sailing close-hauled, has never been settled; for it resolves itself to this. If the boom is hauled further inboard, the yacht sails nearer to the wind, but in an increased ratio loses its speed; for, if it should be hauled completely in till in a line with the keel, the yacht would stop, as has been explained: whilst, the farther out over the side it is allowed to go, the faster the yacht sails, but the farther also from the wind and the direction that it is desired to proceed in to windward. Hence a happy medium must be decided upon;

and there is no doubt but what the result of most races has depended more upon the use of the main sheet, when close-hauled, or beating to windward, than upon any other cause. Just how flat to trim the sheets can only be acquired by experience; but the following general rules will apply: —

As a general principle, the sheets can be trimmed flatter, or farther aft, in light weather and a smooth sea, than in heavy weather and a head sea. In fact, it is impossible to sail as near the wind in lumpy water as in smooth water. After a yacht has been reefed, also, she will not lie as near the wind as before, for the same reasons that compelled the reefing.

With old hands, the yacht, when close-hauled, is allowed to, what sailors call, "go through the water," rather than to point up almost into the wind's eye, and keep bobbing up and down, and advancing very little. In most yachts it will be found by experiment that the main-boom should be at about the angle shown in the figure in the diagram on p. 46, marked "close hauled;" but others may be, perhaps, hauled slightly more inboard: but, as a general law, a good free sheet is the better, especially in a sea-way.

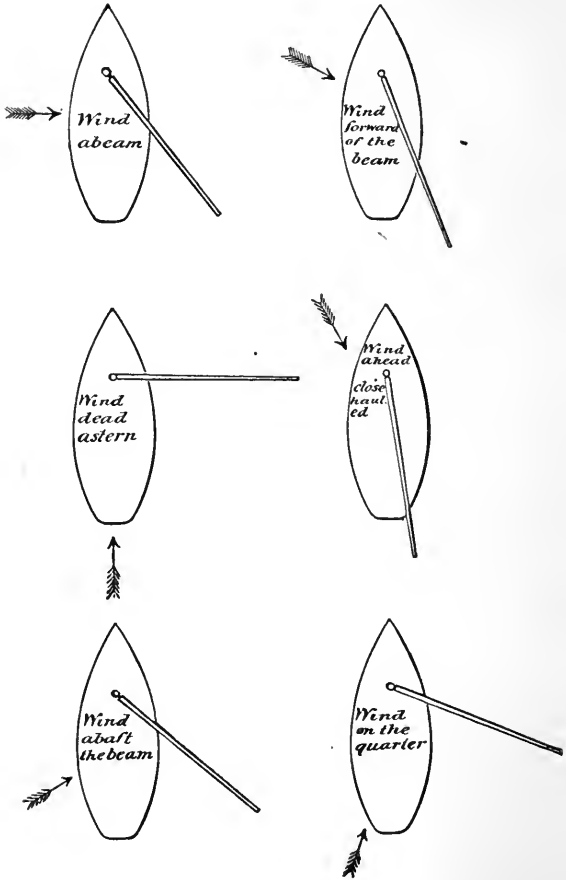
TO KNOW WHEN THE YACHT IS AS NEAR THE WIND AS SHE WILL SAIL

Is important, and it can always be known by the following method. Push the helm very slowly over to leeward, and, as the yacht commences to come towards the wind, keep the eye fastened upon the luff, or inner leach, of the mainsail. As soon as the yacht is too near the wind to have the sail stand full, a little wave will be seen to agitate the luff of the sail, from its head to the foot, usually commencing near the head, and just under the gaff, as that part of the sail is at a further angle from the wind than the part that is fastened to the main-boom; the gaff blowing out much further to leeward, not being confined by a sheet as the main-boom is. This wave, or shake, is caused by the wind getting on both sides of the sail, and, if persisted in, would bring the yacht to a stand-still, with the sail flapping in the wind's eye. But short practice will enable one to see almost instantly this commencement of a shake, that begins to show itself on the mainsail like a smile breaking over the countenance of a pretty woman; and at the first symptom reverse the helm, and keep the yacht in that position which is called sailing "by the wind," or "full and by;" that is to say, full sails, and by the wind. If, after the yacht is in this position, a bearing on shore can be taken to steer by, it will be a good thing;

but as the wind often changes even several points, especially near the coast-line, every few moments, this experiment must be repeated; and it is this keeping a yacht up to her work, and never letting her fall off, and never shaking her, and yet taking advantage of every flaw, that goes to make up the accomplished helmsman. There are other signs besides these, which to a sailor are very simple, that denote to him when the yacht is off the wind; such as the angle at which the wind strikes his face, the direction of the wind on the face of the waters, and the line of the weather-vane at the main truck, and the smoke from his pipe: these will do for him as well as luffing and shaking the mainsail, but the latter method is the perfect one; and, if the yacht can be so steered as to keep just the suspicion of a little smile rippling its luff below the throat of the gaff, it will be the perfection of sailing "close-hauled," or "by the wind."

RUNNING FREE.

When the wind is favorable, and the yacht will lay her course without having to beat towards her destination at an angle against the head wind, as in close-hauled, then the sails are arranged in a different manner; and the main-boom is swung out over the side in just such proportion as the wind may be free, till completely out, so as to hang at right angles with the keel, when the wind is dead aft. (See diagrams.)


Wind abeam
Wind forward of the beam
Wind dead astern
Wind ahead
close hauled
Wind abaft the beam
Wind on the quarter

BEFORE THE WIND, OR SCUDDING.

This is the most difficult steering of any; and in rough water it is very hard to keep the yacht upon her course, for the reason that the seas will lift the stern out of the water, thus at once neutralizing the use of the rudder for a moment, and causing the yacht to yaw. Besides this, the speed changes, this affecting the rudder also. When on top of a sea, and all the sails full, the yacht will go fast: when she attempts to bury her head, and kick up her heels, and becalms the jib and lower part of the mainsail, she will go slower. There is one thing to be guarded against in running before the wind, and that is, the "jibing" of the main-boom; that is to say, the wind getting on the forward part of the sail, from any cause, — whether by change of wind, or on account of bad steering, — and carrying it violently over to the other side, endangering the yacht, and with a liability, in heavy weather, of carrying away the mast. This must be guarded against carefully; and if the sea is very bad, and the yacht steers very wild, it is better to tack down to leeward, as it is termed, that is to say, to haul up the yacht a little towards the wind on either tack, so as to bring it over the quarter, and then run before it for a distance, and then, by careful jibing, bring the wind over the other quarter, and then proceed on.

PILOT'S LUFF.

In harbor-sailing, a buoy or point often appears ahead, which, if passed, the yacht could be at once kept away free, being now close-hauled, thus saving the time and inconvenience of tacking, but, as she is going, will be right in the way, unless she is put about. To avoid tacking in such a case, where the yacht will *almost* stand by, a manœuvre is often executed (if the tide is favorable, and the wind brisk), to avoid tacking, called a "pilot's luff," and consists of — when quite near the object to be passed, and according to its position as right ahead or slightly to leeward — bringing the yacht quickly up into the wind, so that the sails shake, and by her own momentum shooting her dead to windward once or twice her length; and then, before her headway is lost, and the rudder, therefore, useless, keeping her off again till every thing draws, when the same manœuvre may be again executed, each time gaining a position farther to windward than could have been gained in any other way, except by going about on the other tack.

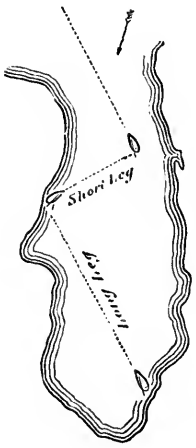
It takes a steady hand at the tiller, and a good calculation of the momentum of the yacht, to execute a pilot's luff well: but it is very useful often, if well performed, and very disastrous in a race; for instance, if the helmsman succeeds in getting the yacht "into irons," and with a stern-board on,

as may be the case if he brings her up too high, or neglects to move the helm in time to get back upon his course before the momentum of the yacht is lost, or lets her go about on the other tack. A pilot's luff is a very pretty manœuvre when well executed; and you shall see many an old boatman squeezing his boat by a point, instead of taking the trouble of going about, knowing, that, the moment he has doubled it, his course will be such that the wind will be fair, and he can then ease off his sheets, and go on his way rejoicing.

CHAPTER IV.

Tacking. — Beating to Windward. — A Long and a Short Leg. — How to put a Yacht about. — How to distinguish the Starboard Tack from the Port Tack. — Jibing, or Wearing. — Dropping the Peak. — To beat to Windward in a Tide-Way. — To take in a Jib, and furl it. — To take in a Mainsail, and furl it. — To reef a Jib, or take off a Bonnet. — To clap one Reef in a Mainsail. — To cast out a Reef.

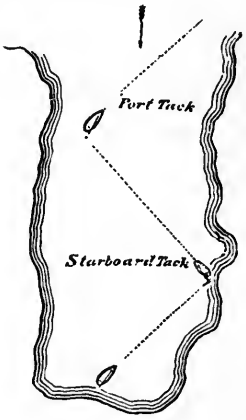
TACKING



Is the art of putting a yacht about, so that the wind, which has been blowing upon the starboard side, we will say, shall blow upon the port side, or on the opposite side of the sails to which it was before the manœuvre was executed, and, when used to force the vessel by a series of angles towards the direction from which the wind proceeds, is called "beating to windward." Sometimes the wind is not dead ahead, and yet

in such a direction that the yacht cannot proceed except by tacking once in a while. This is termed *making a long and a short leg.* (See diagram.)

We will first explain how a yacht is put about in heavy weather and with seamanlike accuracy.



In the first place, let us define the starboard tack from the port tack, and *vice versa.* It must be remembered that a yacht is on the starboard tack when the main-boom is out over the port quarter, and the port jib-sheets trimmed down; and on the port tack, when the main-boom is out over the starboard quarter; or the starboard jib-sheets trimmed down; or a yacht is said to be on the starboard tack when the wind blows so as to hit the starboard side of the boat, and *vice versa.* This is very useful to remember; for there are several "rights of way" that one has when on the starboard tack, which will be treated of hereafter. The windward side of the yacht also denotes which tack she is upon, the name of the weather-side being the name of the tack. We will suppose that the yacht is on the starboard tack, with the main-

boom out over the port quarter, the port jib-sheets trimmed down, and the yacht close-hauled to the wind. Have every thing gotten ready for tacking, by singing out, *Ready about!* when all assistants should take their positions as before instructed; then (we will suppose you are steering your own yacht) keep off till the yacht is going a good full through the water, and then, by means of the tiller gradually pressed hard over to port, bring her into the wind's eye, singing out, as the tiller is being moved, "*Hard a-lee;*" at which command the assistant at the jib-sheet should cast off all but one turn, and, as the boat starts into the wind, should cast that off, letting the jib fly loosely at the command, *Let go the jib-sheet!* which follows quickly the announcement of "Hard a-lee." Then, unless the yacht gets a stern-board, which has been explained elsewhere, she is helped round by pushing the main-boom — which is made fast by its sheet, and works itself — out over the starboard quarter. When the yacht is just about to pass the direction of the wind, and is nearly upon the other tack, give the order to "*trim down on the port jib-sheet,*" — the same sheet as has just been cast off; and the outer surface of the sail will act as a lever to push the head of the yacht off till the wind fills the mainsail, when the order, "*Let draw!*" should be given, and the jib-sheet let go on the port side, and trimmed down as fast as slacked, by another assistant on the starboard side. (See diagrams.)

THE ART OF TACKING

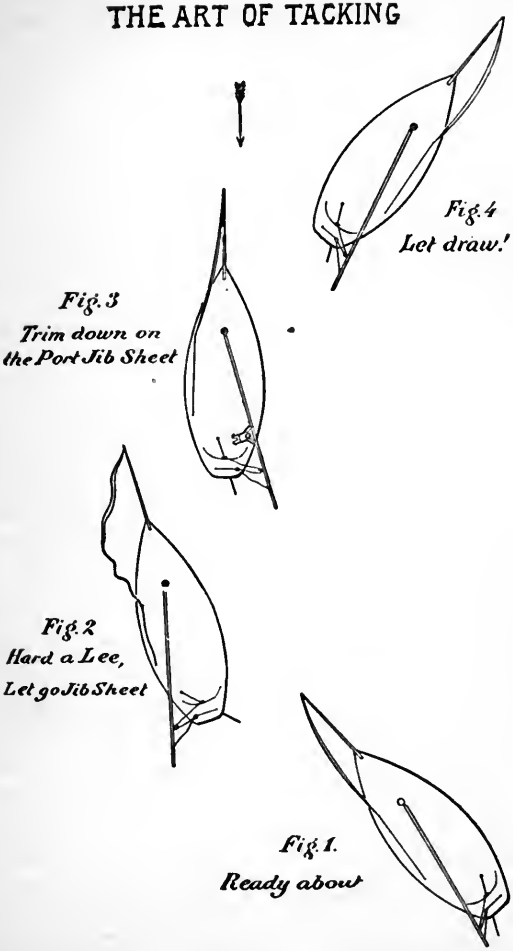


Fig. 4
Let draw!

Fig. 3
Trim down on the Port Jib Sheet

Fig. 2
Hard a Lee, Let go Jib Sheet

Fig. 1.
Ready about

When the weather is light, the yacht small, or particularly easy in coming about, all the above may not need to be executed. Some vessels will come about without starting the head-sheets; others always need it; some always get stern-way, and need the helm shifted to bring them round; whilst the centre-board boats, as a class, fly round without touching any thing. But it is well to know how to get a yacht about in a heavy sea; and all the principles that will help bring about this result have been given above.

JIBING, OR WEARING.

There are times when the sea is too high, and the sail so much reduced that a yacht will not go about by turning towards the wind, but must be gotten on the other tack by wearing, as it is technically called in ships, where the yards are square, and jibing, as it is called in crafts that carry fore-and-aft sails, i.e., sails that hoist up on a mast, and are stretched upon booms, in contradistinction to those that are fastened to yards that cross the mast at right angles, as in a ship often called by sailors, for this reason, a "square-rigger."

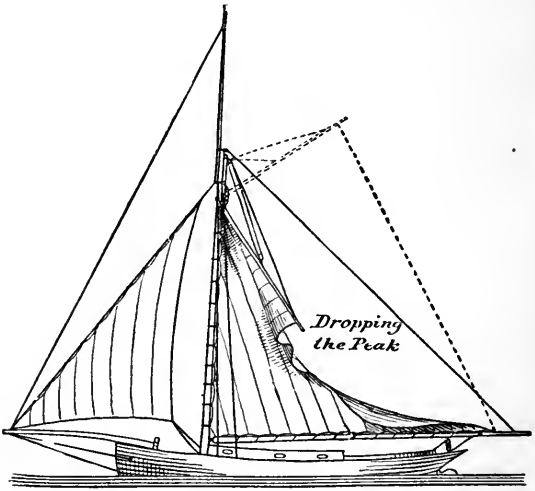
Jibing is at all times a delicate manœuvre, as many have found out to their sorrow if they have ever been careless. It is also a very deceptive manœuvre, to any but sailors. How easy it is for land-lubbers, after facing a good square breeze, to

think, when the yacht is kept away before it, that the wind has gone down! And the writer has actually brought his yacht to the wind again, to convince one sceptic that it was the position of the yacht *wholly* that caused all the change; which is extremely marked, as all must allow. It is from this treacherous smoothness, after so much buffeting about when close-hauled, that all the mischief occurs; for the boom often, if carelessly allowed to jibe, will fill with wind, and, as it goes over, either part the main-sheet, or carry away the mast, or do other damage, sometimes of a very serious nature. It is forgotten, also, in this manœuvre, that, when the mainsail comes aft, there is a moment when it flutters in the wind's eye; and the yacht, relieved of its immense pressure, loses in a great measure her momentum, and then, when the sail fills with a rush, sufficient allowance for the loss of speed, and the force of the hurrying wind that fills the great mainsail, is not taken into account.

This manœuvre must, however, be executed when the yacht will not go about by turning to windward; but it is advised to use this method as little as possible, except in light summer airs in inner harbors, when it may be executed with impunity and without any danger of mishaps.

We will suppose a yacht is running before the wind on the port tack, with the main-boom off to its fullest extent; which is a position that she will

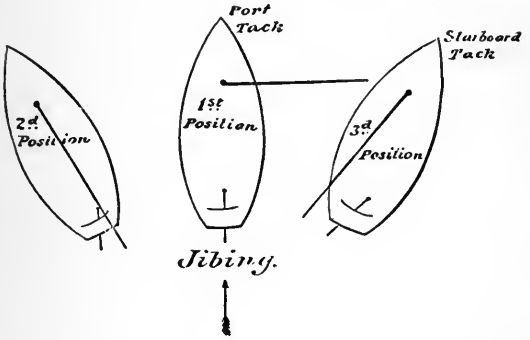
reach in turning to leeward, from any other position, either close-hauled or running free, before she can be jibed. It is always safer, if the wind is at all strong, "to drop the peak" before attempting the evolution. "Dropping the peak" consists of letting



go the peak-halliards of the mainsail, so that the outer clew and head of the sail, that is attached to the gaff, will be lowered down so as to dangle alongside of the mainmast, with the gaff pointing to the deck. This makes of the mainsail, for the time being, a sort of triangular or leg-of-mutton sail, and takes off the leverage of the high part,

that the wind might fill in jibing, and thus press over the yacht dangerously. (See diagram.)

After dropping the peak, commence hauling in upon the main-sheet, keeping the yacht all the time turned a very little towards the wind on the port side, till the main-sheet is hauled chock aft,



and the main-boom almost amidships; then take a good turn with it, and shift the helm gradually, till the wind is on the starboard side slightly, and the sail has filled with a slat upon that tack; when the main-sheet may be slackened, the peak hoisted, and the yacht kept on her course.

BEATING TO WINDWARD IN A TIDE-WAY.

It is very important at times to know how a current sets; for, in beating to windward, it makes all

the difference in the world often, which tack the yacht is upon, and whether she is heading well up to the tide, or crossing it at such an angle as to receive its whole force; and, being swept to leeward, the direction of the current will decide which tack to keep the longer upon, and to make as short as possible the tack that brings the keel at right angles to the current. Manage the yacht, also, so that, when the current or tide-way is faced in the place of its greatest strength, the yacht shall be upon the tack that nearly stems it, and that she shall be placed upon the unfavorable tack only when she approaches parts of the tide-way where the current may be less strong. A knowledge of the direction of a tide-way, and how to take advantage of it, has won many a race.

TO TAKE IN A JIB, AND FURL IT.

It is best to first bring to by the wind; but the jib can be taken in and furled, with the yacht in different positions.

Stand by the jib-halliards, and have the down-haul well manned, also the lee jib-sheet; then, at the command, "Down jib!" or, "Let go the jib-halliards!" or, "Take in the jib!" the halliards are cast off, the lee jib-sheet eased off, and the down-haul bowsed upon, till the head of the jib is snug down to the boom, when it should be carefully belayed, and the lee-sheet again made fast,

leaving a little slack for furling. Then lay out upon the bowsprit, on the weather-side, and pick up the sail from out to leeward, and furl it to the bowsprit by means of gaskets, or stops, or in any way that is arranged for, being careful, if the yacht is pitching much, not to be thrown over the bowsprit to leeward, if submerged in a sea; for the person is suddenly lifted by a sea that may reach only to the middle, and, if care is not taken, pitched over the bowsprit and to leeward. Having made every thing fast, lay in, and set taut the jib-halliards, and belay them, and bring the after-clew of the jib amidships, by setting taut on the starboard and port jib-sheets, and belaying them, and coiling down every thing snug.

TO TAKE IN A MAINSAIL, AND FURL IT.

Bring the yacht close to the wind, and haul the main-sheet flat aft, and belay it carefully; for, if it should get adrift whilst the sail was being furled, some one might be knocked overboard. Then stand by the throat and peak-halliards, and, at the word "Lower away," ease away handsomely on each, taking care not to let the peak drop too fast, which, if done, sometimes causes the hoops to jam, and the whole sail to stick, till the peak-halliards are hoisted upon again to clear things. When the sail is wholly down, make fast the halliards, and get along on the weather-side of the main-boom, and

pick up the sail by what is called "skinning it;" that is to say, not to haul it up bodily upon the boom, but by repeatedly taking the canvas, and shaking it towards one, it is finally rolled up so as to lay snugly on the boom, to which it should be fastened by gaskets. The main-boom should then be lifted into a crotch, if one is used, and the throat and peak-halliards hauled taut, and the main-sheet again belayed, as it will have to be slacked to get the crotch under the boom, and every thing coiled up snug, and belayed.

REEFING.

This consists of the art of reducing the sails of a yacht in heavy weather, so that she will not be top-heavy, and be able to stand up bravely against the coming blast. And here let the writer beg all persons who desire to be advised at all, not to delay reefing too long; and always put in two reefs rather than one, if the weather looks very dirty. Reefing before bad weather reaches one is quite another thing than trying to reef down in the middle of a thunder-storm in which one has been caught by holding on too long.

TO REEF A JIB, OR TAKE OFF THE BONNET.

If fitted with a bonnet, instead of reef-points, bring the yacht to the wind, lower away on the jib-halliards, and bowse on the down-haul, and lower

the jib enough so as to bring the reef-cringle down to the bowsprit; then, if a bonnet, unlace and cast off, and, if reef-points, tie up the sail with them, and lash the outer clew to the bowsprit, and cast off the jib-sheet blocks, and hook the sister-hooks into the reef-cringle; hoist up the sail, and trim it.

TO PUT ONE REEF IN A MAINSAIL.

Haul down the jib, bring the yacht to the wind, haul the main-boom chock aft, and belay the sheet carefully; lower away on the throat and peak halliards till the reef-band is down somewhat lower than the main-boom; then, by means of the reef-pennant rove through the reef-cringle on the outer leach of the sail, bowse the foot out on the boom, and lash it fast by passing an earing through the cringle, and around the boom by several turns, till the clew of the sail is securely fastened; then pass an earing from the reef-cringle in the luff of the sail around the main-boom in the same manner, and commence fastening the reef-points, either around the main-boom, or to an iron jackstay fastened to the boom, or around the foot of the sail, according as the yacht may be arranged, remembering to make each knot a square knot, and not a "granny."

After the sail is half lowered in this manner, so as to get at the reef-band, &c., the yacht is kept head to sea and "hove to," by placing the tiller towards the lee-side of the yacht, or what is called

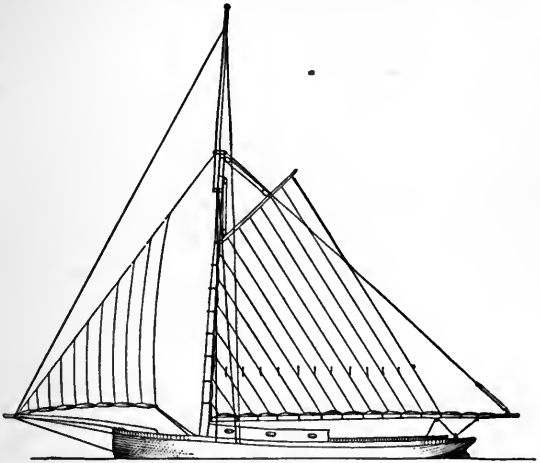
"hard a-lee," where it is secured till the vessel is reefed, and started again on her way. In reefing, always haul out on the reef-pennant first, and stretch the foot of the sail, and then lash the luff next, and fasten the reef-points last.

When the points are all tied, hoist away on the throat and peak-halliards, and set the sail.

TO TAKE IN A SECOND REEF.

Proceed in exactly the same manner, except that, in first commencing to reef, two reefs can be taken in one by lowering the sail to the second reef-band, and proceeding in exactly the same manner as in the first reef, except that the two extremities of the sail are lashed at the second reef-band cringles; and, in tying the reef-points, no notice is taken of the first reef-points, but they are stowed with the rest of the sail to the boom, and are not tied. This taking two reefs in one is often done when caught suddenly and a great reduction of sail is needed at once; and it is as useful and safe as if one reef above the other had been properly tied, the only difference being, that if the weather should moderate, so that the yacht would need but one reef, instead of the two she has in, nothing can be done, till the weather is enough settled to carry all sail, towards shaking out the two reefs in one, which would, of course, shake out the whole sail: and valuable time may be lost for want of more sail,

set; but, if it is really needed, the two reefs in one can be cast out, and a single reef taken in.



Reefed Sails

TO SHAKE OUT A REEF.

Bring the yacht to the wind in the same manner as for reefing, and unknot carefully all the reef-points *first*, then cast off the lashing at the luff, and, lastly, the earing at the end of the boom.

CHAPTER V.

Signal-Lights. — The United-States Regulations for Steering and Sailing, and the Rules of the Road. — Fog-Signals. — Salutes. — Dipping Colors. — Coming alongside. — Quarter-deck Etiquette. — Useful Articles of Cabin Furniture. — Anchor Watch. — Method and System *versus* Disorder.

SIGNAL-LIGHTS.

In all night sailing it is important to know the direction in which any passing vessel is proceeding, and also to be able to give notice of the direction in which one's own yacht is sailing, or, if she be at anchor, to so denote, so as to avoid collisions; and, for this purpose, law and custom have made certain fixed rules, the most important of which, and those that are necessary for usual contingencies, are here appended.

RULES OF THE ROAD; OR, STEERING AND SAILING RULES OF THE UNITED STATES.

Article 2. — The lights mentioned in the following articles, and no others, shall be carried in all weathers between sunset and sunrise.

LIGHTS FOR STEAMSHIPS.

ART. 3. — All steam vessels, when under way, shall carry (*a.*) At the foremast head a bright white light, so fixed as to show a uniform and unbroken light over an arc of the horizon of twenty points of the compass; so fixed as to throw the light ten points on each side of the ship, viz., from right ahead to two points abaft the beam on either side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least five miles.

(*b.*) On the starboard side a green light, so constructed as to throw a uniform and unbroken light over an arc of the horizon of ten points of the compass; so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles.

(*c.*) On the port side a red light, so constructed as to show a uniform, unbroken light over an arc of the horizon of ten points of the compass; so fixed as to throw the light from right ahead to two points abaft the beam on the port side; and of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles.

NOTE. — *To fix firmly in the mind the side of the vessel on which the lights belong, the following, although original, is recommended:* PORT WINE *is red, and the* RED LIGHT *is always on the* PORT SIDE.

(*d.*) The said green and red side-lights shall be fitted with inboard screens, projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

LIGHTS FOR STEAM-TUGS.

ART. 4. — Steamships, when towing other ships, shall carry two bright white masthead lights vertically, in addition to their side-lights, so as to distinguish them from other steamships.

LIGHTS FOR SAILING-VESSELS.

ART. 5. — Sailing-vessels under way, or being towed, shall carry the same lights as steamships under way, with the exception of the white masthead lights, which they shall never carry.

EXCEPTIONAL LIGHTS FOR SMALL SAILING-VESSELS.

ART. 6. — Whenever, as in the case of small vessels during bad weather, the green and red lights cannot be fixed, these lights shall be kept on deck, on their respective sides of the vessel, ready for instant exhibition; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side, nor the red light on the starboard side. To make the use of these portable lights more certain and easy, they shall each be painted outside with the color of the light they respectively contain, and shall be provided with suitable screens.

LIGHTS FOR SHIPS AT ANCHOR.

ART. 7. — Ships, whether steamships or sailing-ships, when at anchor in roadsteads or fairways, shall, between sunset and sunrise, exhibit where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light in a globular lantern of eight inches in diameter, and so constructed as to show a clear, uniform, and unbroken light visible all around the horizon, and at a distance of at least one mile.

LIGHTS FOR PILOT-VESSELS.

ART. 8. — Sailing pilot-vessels shall not carry the lights required for other sailing-vessels, but shall carry a white light at the mast-head, visible all around the horizon; and shall also exhibit a flare-up light every fifteen minutes.

LIGHTS FOR FISHING VESSELS AND BOATS.

ART. 9. — Open fishing-boats and other open boats shall not be required to carry side-lights required for other vessels, but shall, if they do not carry such lights, carry a lantern having a green slide on the one side, and a red slide on the other side; and, on the approach of or to other vessels, such lantern shall be exhibited in sufficient time to prevent collision; so that the green light shall not be seen on the port side, nor the red light on the starboard side. Fishing-vessels and open boats when at anchor, or attached to their nets, and stationary, shall exhibit a bright white light. Fishing-vessels and open boats shall, however, not be prevented from using a flare-up light in addition, if considered expedient.

RULES GOVERNING FOG-SIGNALS.

FOG-SIGNALS.

ART. 10. — Whenever there is a fog, whether by day or night, the fog-signals described below shall be carried and used, and shall be sounded at least every five minutes, viz.: —

(*a.*) Steamships under way shall use a steam-whistle placed before the funnel, and not less than eight feet from the deck.

(*b.*) Sailing-vessels under way shall use a fog-horn.

(*c.*) Steamships and sailing-ships, when not under way shall use a bell.

STEERING AND SAILING RULES.

TWO SAILING-SHIPS MEETING.

ART. 11. — If two sailing-ships are meeting end on, or nearly end on, so as to involve risk of collision, the helms of both shall be put to port, so that each may pass on the port side of the other.

TWO SAILING-SHIPS CROSSING.

ART. 12. — When two sailing-ships are crossing so as to involve risk of collision, then, if they have the wind on different sides, the ship with the wind on the port side shall keep out of the way of the ship with the wind on the starboard side, *except* in the case in which the ship with the wind on the port side is close-hauled, and the other ship free, in which case the latter ship shall keep out of the way. But if they have the wind on the same side, or if one of them has the wind aft, the ship which is to windward shall keep out of the way of the ship which is to leeward.

. . . . . .

SAILING-SHIP AND SHIP UNDER STEAM.

ART. 15. — If two ships, one of which is a sailing-ship and the other a steamship, are proceeding in such directions as to involve risk of collision, the steamship shall keep out of the way of the sailing-ship.

SHIPS UNDER STEAM TO SLACK SPEED.

ART. 16. — Every steamship, when approaching another ship so as to involve risk of collision, shall slacken her speed, or, if necessary, stop and reverse; and every steamship shall, when in a fog, go at a moderate speed.

VESSELS OVERTAKING OTHER VESSELS.

ART. 17. — Every vessel overtaking any other vessel shall keep out of the way of the said last-mentioned vessel.

CONSTRUCTION OF ARTICLES 12, 15, AND 17.

ART. 18. — When, by the above rules, one of two ships is to keep out of the way, the other shall keep her course, subject to the qualifications contained in the following article: —

PROVISO TO SAVE SPECIAL CASES.

ART. 19. — In obeying and construing these rules, due

regard must be had to all dangers of navigation, and due regard must also be had to any special circumstances which may exist in any particular case, rendering a departure from the above rules necessary in order to avoid immediate danger.

NO SHIP UNDER ANY CIRCUMSTANCES TO NEGLECT PROPER PRECAUTIONS.

ART. 20. — Nothing in these rules shall exonerate any ship, or the owner or master, or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

The following diagrams are designed to illustrate the use of the lights carried by vessels at sea as prescribed in the Regulations above, and the manner in which they indicate to each vessel the position and course of the other.

FIG. 1 (when the *red* and *green lights* are both seen). — A sees a *red* and *green* light ahead. A knows that a vessel is approaching him on a course directly opposite to the one he is steering, as B. If A sees a *white masthead light* above the *red* and *green lights*, he knows that the vessel B is a steamer. A should put his helm to port; and B, seeing the same lights on board of A, should by the same rule put his helm to port also.

FIG. 2 (when the *red light* only is seen). — A sees a *red light* ahead or on the port bow. A

Fig. 1.

Fig 2.

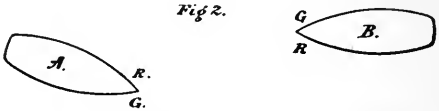


Fig. 3.

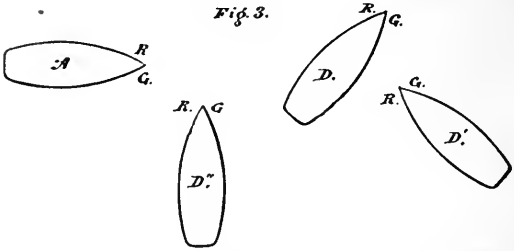


Fig. 4

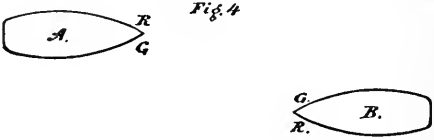
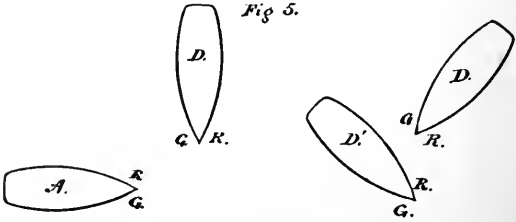


Fig 5.



knows that either, first, a vessel is approaching him on his port bow, as B, or, second, a vessel is crossing his bows to port in some direction, as D D′ D″ (Fig. 3). If A sees a *white masthead light* above the *red light*, he knows that the vessel is a steamer, and is either approaching in the same direction as B (Fig 2), or is crossing to port in the same direction as D D′ D″ (Fig. 3).

In the first position (Fig. 2) A sees B a little on the port bow, B's *red light* exposed, and, by the diagrams, B should see A's *red light* as well; in which case both vessels should put their helms to port.

In the second position (Fig. 3) A sees D on his starboard bow, and, from the fact that he only sees D's *red light*, he knows that D must be steering in some direction, as at D D′ D″; at the same time, D D′ D″ will see A's *green light on his port bow*.

In this case, A, having D clearly on his starboard bow, should put his helm to starboard to turn from D, and D, having A clearly on his port bow, should put his helm to port to turn to starboard from A.

Fig. 4 (when the *green light* is seen, and the *red light* is not seen).—A sees a *green light* ahead, or on his bow. A knows that either, first, a vessel is approaching him on his starboard bow, as B, or, second, that a vessel is crossing his bow in some direction to starboard, as D D′ D″ (Fig. 5).

If A sees a *white masthead light* above the

green light, A knows that the vessel is a steamer, and is either approaching him in the same direction as B, or is crossing to starboard in some direction, as D D′ D″.

In the *first position* A sees B on his starboard bow, B's *green light* exposed, and, by the diagram, B should see A's *green light* as well; in which case both vessels should put their helms to starboard.

In the *second position* A sees D on his port bow, and, from the fact that he only sees D's *green light*, he knows that D must be steering in some direction, as D D′ D″; at the same time D will see A's *red light* on his starboard bow. In this case A, having D clearly on his port bow, should put his helm to port to turn from D; and D, having A clearly on his starboard bow, should put his helm to starboard to turn to port from A.

SALUTES.

When lying in harbor in a well-ordered and disciplined yacht, considerable ceremony is made in hauling down the colors at sunset, and hoisting them at sunrise. It is customary to have this done with great exactness, and to the very minute often, at which the sun rises or sets, as ascertained by the nautical almanac, at the discharge of a swivel or small cannon; when all the colors aloft, including the ensign and private signal, should commence to descend towards the deck together, and at the same

rate of speed. To execute this graceful ceremony it becomes necessary to post two hands at each of the signal-halliards, — one to haul down the color, the other to check it on its descent, so as to have it move with the same speed as the ensign, by which all other colors are regulated; then, with two hands to each flag, with the signal-halliards cast off, and every thing clear, and ready to lower away, another hand is placed at the swivel, and when the second-hand of one's watch touches the minute of sunset, the command "Fire!" is given, and down drop gracefully and slowly all the colors that are aloft. They may be set in the morning in the same way, or may be made up in a bundle on deck, and hoisted to their position aloft, when at a given signal, or discharge of a cannon, the stop is jerked asunder, and they are unfolded to the breeze at the same instant of time. This is a more graceful method than hoisting them up from deck, which, at the best, causes a jerky movement of the bunting.

In a sloop-yacht the ensign is carried always at the end of the gaff, when hoisted; and the burgee, or private signal, at the topmast head.

When passing a vessel at sea that has her colors set, it is always courtesy to bend on one's own, and, as the nearest point is reached, lower the ensign half way towards the deck, and then hoist it back again to its position at the peak. This is called "dipping the colors;" and the smaller vessel should always be the one to offer the courtesy first.

If a man-of-war is met, care should be taken to be always the first; and here it is proper to dip one's ensign three times, as is it also to any large and important vessel, such as an European steamer moving along in all her majesty: she will not neglect to answer the politeness.

In entering harbor, especially if there are other yachts lying at anchor, it has become customary, at the same moment that the anchor is dropped, to discharge a gun announcing one's arrival; and, if there are other yachts present to whom the yacht is known, she will receive probably a salute from each in return.

In coming alongside of a yacht at anchor, all persons who are not guests of the captain, or especially invited, or of some rank or consequence, should come to the port gangway. The starboard-side of a vessel at anchor is the captain's side, as is that side of the deck which is the windward-side when she is under way. Ladies always come on board on the starboard-side, if the yacht be large enough to enter into all these niceties of quarter-deck etiquette.

Every yacht that is large enough to admit of it should be fitted with a ship's clock with watch movement, a swinging-lamp, and an aneroid barometer; all of which are of great use, — the clock to give the time which courses have been sailed; the lamp, light to the chart upon the table; and the barometer, admonition of a change in the weather.

It is of great importance that an "anchor-watch," as it is called, should be kept on all yachts, for many reasons. For instance, to see that none of the sails get adrift in the night, should it come on to blow; and to see that the anchor holds well, or to pay out more cable, if necessary; to watch the lantern in the fore-rigging, and take care that it does not go out, leaving the yacht at the mercy of the first lumber-man that may come pitching into her.

Do not anchor too near the shore, so that good sea-room cannot be obtained, should it be desired to get under way, to run out of the harbor, or to pay out cable to hold on.

It is very easy to row to the shore in a tender, with the yacht well out, but very hard to make an inch sometimes, when it becomes a lee-shore.

These may seem trivial matters to be so careful about; but it is looking out for all contingencies, and yet being without a particle of fear, that makes the true yachtman, — always ready, and every thing always on hand. It is for this very reason of being prepared, that fear is driven out; whilst, with the careless one, in times of emergency the ropes foul, the gaskets are missing, the anchor is not bent on, the lamp wants oil, the lead-line can't be found, and the jib-halliards, not being properly belayed and coiled down, unreve from the masthead block, and every thing is "at sixes and at sevens."

CHAPTER VI.

Cross-Bearings. — Two Examples. — Table of Proportional Distances. — Table for Determining the Distance that an Object at Sea can be seen in Statute Miles. — Determining Distance by the Flash of a Gun. — To find the Difference between the True and Apparent Direction of the Wind. — To find the Distance of an Object on Shore from the Yacht, by two Bearings of the Compass. — Use of the Charts. — Soundings. — Lead Line. — Eight Bells and Watch and Watch. — Boxing the Compass. — Velocity of the Wind. — The Log Reel and Half-minute Glass. — Buoys.

CROSS-BEARINGS.

PERHAPS there is nothing more useful in simple coast-sailing and entering harbors than to know how to find one's exact position upon the chart, at a moment's notice, by means of taking what is called *cross-bearings*. Nothing is necessary for this purpose, but a pair of parallel-rulers, a compass, and a sight of any two well-defined objects in view, that may be known upon the chart by their general relative positions, such as lighthouses, lightships, buoys, churches, headlands, &c.

The *parallel-rulers* are two rulers attached by

means of two brass swivels, so that they can be moved over the surface of a chart in any parallel direction to that from which they are first started; and are used to define direction upon any part of the chart. For instance, being placed upon the printed compass upon the chart, say upon the line of N.W. and S.E., they can be moved about the chart, carrying this same direction N.W. and S.E., to any other part of the chart. The two objects decided upon to be taken should be in such a direction as to form somewhat nearly a right angle with the yacht to obtain the most perfect results. All depends upon the aptitude with which the observer can *line* the object to be observed, i.e., its bearing by compass.

The writer knows of nothing so important and useful as this simple method of knowing just where one is at any moment, and thus be enabled to know just how to steer to avoid all dangers. These sights, or cross-bearings, can be taken every ten minutes with ease in fine weather, and the position of the yacht exactly defined.

EXAMPLE I. (see diagram, Fig. 1).—Bring the compass in its box on deck (it should be of large size, so as to guide the eye; and small pocket-compasses are useless for this purpose), and, standing behind it, line with the eye with great care the bearing of the north lighthouse by the compass, this we will suppose to be N.W. by N.; mark this upon

a slip of paper, and then move the person so as to see the south lighthouse in the same way across the face of the compass, which is always between the observer and the object to be observed; and line the bearing of this lighthouse by compass, in the same manner, which we will suppose to be S.W. With these two results marked upon paper, refer to the chart, and place the parallel-rulers upon the printed compass, designed upon the chart, upon the line of N.W. by W. and S.E. by S. (its opposite), and move them by means of the pivots till one part of them rests upon north lighthouse; then draw a line of indefinite length upon the chart. Take up the rulers, and in the same manner place them upon the printed compass on the chart, on the line of S.W. and N.E., and carry them forward, keeping this angle, till some part rests upon south lighthouse; then draw a line which will at some point intersect the former line, which, if the bearings have been correctly taken, will be the exact position of the yacht at the time of the observation.

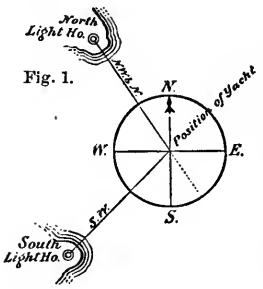


Fig. 1.

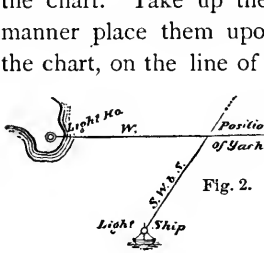


Fig. 2.

It will be shown too, by experiment, that considerable variation of the bearings, when the angle is large, may be made, without changing very much the position of the yacht, proving how valuable this process is for practical use, as a considerable error in the bearings will still enable one to know almost exactly the position of the yacht; whilst a good observation will give it exact.

EXAMPLE II. (see diagram Fig. 2). — Placing the compass in front of the observer, it is found that the lighthouse bears W. by compass, and that the lightship bears S. W. by S. With these two bearings we consult the chart, and lay off the two lines by means of the parallel-rulers; and, if the chart gives the distance in miles of the lightship from the lighthouse, then, by means of a common rule of equal parts, we shall be able to measure the distance of the yacht from the lighthouse or from the lightship. At the foot of most charts, however, will be found a scale of miles, and, having once ascertained the exact position of the yacht by means of cross-bearings, it will be very easy, with a pair of dividers, to find its distance in miles from any desired object within view, or designed upon the chart, and, by the use of the parallel-rulers, the course, by compass, that should be sailed to reach any desired point.

It is often useful to know how many geographical or nautical miles, which measure at the equator

6,086.4 feet in length, are contained in a degree of longitude at different latitudes; that is to say, a degree of longitude east or west of 89° N. latitude is only 1.05 nautical mile in length; and yet, in another sense, this 1.05 is 60 miles, or one degree in length: hence the following table: —

A TABLE SHOWING, FOR SEVERAL DEGREES OF LATITUDE, HOW MANY MILES DISTANT THE TWO MERIDIANS ARE WHOSE DIFFERENCE OF LONGITUDE IS ONE DEGREE.

Lat.	Miles.	Lat.	Miles.	Lat.	Miles.	Lat.	Miles.
15	57.96	26	53.93	37	47.92	48	40.15
16	57.68	27	53.46	38	47.28	49	39.36
17	57.38	28	52.98	39	46.63	50	38.57
18	57.06	29	52.48	40	45.96	51	37.76
19	56.73	30	51.96	41	45.28	52	36.94
20	56.38	31	51.43	42	44.59	53	36.11
21	56.01	32	50.88	43	43.88	54	35.27
22	55.63	33	50.32	44	43.16	55	34.41
23	55.23	34	49.74	45	42.43	56	33.55
24	54.81	35	49.15	46	41.68	57	32.68
25	54.38	36	48.54	47	40.92	58	31.80

TABLE FOR DETERMINING THE DISTANCE THAT OBJECTS AT SEA CAN BE SEEN IN STATUTE MILES.

NOTE. — Enter the table in the column of height in feet, which represents the height of the observer above the sea; and opposite to it, in the column of miles, will be the result.

HEIGHT IN FEET.	MILES.	HEIGHT IN FEET.	MILES.	HEIGHT IN FEET.	MILES.	HEIGHT IN FEET.	MILES.	HEIGHT IN FEET.	MILES.	HEIGHT IN FEET.	MILES.
1	1.32	13	4.77	25	6.61	37	8.05	49	9.26	105	13.56
2	1.87	14	4.95	26	6.75	38	8.16	50	9.35	110	13.88
3	2.29	15	5.12	27	6.87	39	8.26	55	9.81	115	14.19
4	2.65	16	5.29	28	7.00	40	8.37	60	10.25	120	14.49
5	2.96	17	5.45	29	7.12	41	8.47	65	10.67	125	14.79
6	3.24	18	5.61	30	7.25	42	8.57	70	11.07	130	15.08
7	3.50	19	5.77	31	7.37	43	8.68	75	11.46	135	15.37
8	3.74	20	5.92	32	7.48	44	8.78	80	11.83	140	15.65
9	3.97	21	6.06	33	7.60	45	8.87	85	12.20	145	15.93
10	4.18	22	6.21	34	7.71	46	8.97	90	12. 5	150	16.20
11	4.39	23	6.34	35	7.83	47	9.07	95	12.	160	16.73
12	4.58	24	6.48	36	7.94	48	9.17	100	13.23	170	17.25

EXAMPLE I. — Sailing along in the yacht "Firefly," from the top of the house on which I was standing, which brought my eyes to about 12 feet above the level of the sea, I observed seaward the head of a gaff topsail that evidently belonged to a

yacht of about ten tons, and was therefore estimated to be about 45 feet from the level of the sea. How far were these vessels from each other?

In the table,

Opposite 12 feet stands	4.58 miles
Opposite 45 feet stands	8.87
Distance apart	13.45 miles

EXAMPLE II. — Sailing towards the land, I mounted the shrouds of my yacht till my eye was about 16 feet above the level of the ocean, where I sighted the top of a known lighthouse that I was looking for, which the chart informed me was 145 feet above the level of the sea. Required the distance of the lighthouse.

In the table,

Opposite 16 feet stands	5.29 miles
Opposite 145 feet stands	15.93
Distance	21.22 miles

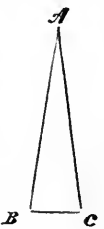
Upon seeing the flash of a gun I counted 30 seconds by a watch before I heard the report. How far was the gun from me, supposing that sound moves at the rate of 1,142 feet per second?

The velocity of light is so great, that the seeing of any act done, even at the distance of a number of miles, is instantaneous. But by observation it is found that sound moves at the rate of 1,142 feet

per second, or about one statute mile in 4.6 seconds: consequently the number of seconds elapsed between seeing the flash and hearing the report being divided by 4.6 will give the distance in statute miles. In the present example the distance was about $6\frac{1}{2}$ miles, because 30 divided by 4.6 gives $6\frac{1}{2}$ nearly.

To find the difference between the true and apparent direction of the wind.

Suppose that a yacht moves in the direction C B from C to B, while the wind moves in its true direction from A to B, the effect on the boat will be the same as if she be at rest, and the wind blow in the direction A C with a velocity represented by A C, the velocity of the yacht being represented by B C. In this case, the angle B A C will represent the difference between the true and apparent direction of the wind, the apparent being more ahead than the true; and, the faster the vessel goes, the more ahead the wind will appear to be. We must, however, except the case where the wind is directly aft, in which case the direction is not altered.



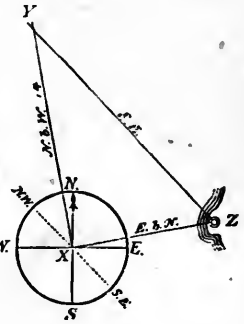
It is owing to the difference between the true and apparent directions of the wind that it appears to shift its direction by tacking ship; and if the difference of the directions be observed when on

different boards (the wind on both tacks being supposed to remain constant, and the yacht to have the same velocity, and to sail at the same distance from the wind), the half-difference will be equal to the angle B A C. By knowing this, together with the velocity of the yacht B C, and the angle B C A, we may obtain the true velocity of the wind; or by knowing the velocity of the wind and of the yacht, and the apparent direction of the wind, we may calculate the difference between the true and apparent directions of the wind.

Thus, if the velocity of a yacht, represented by B C, be 7 miles per hour, that of the wind, represented by A B, 27 miles per hour, and the angle with the yacht's course, with the apparent direction of the wind B C A, equal to $7\frac{1}{2}$ points, the difference between the true and apparent directions of the wind will be obtained by drawing the line B C, equal to $7\frac{1}{2}$ points; then with an extent equal to 27 miles, taken from the scale, and with one foot in B, describe an arc, to cut the line A C in A; join A B; then the angle B A C, being measured, will be the required difference between the true and apparent directions of the wind.

Sailing in my yacht, I saw a lighthouse bearing E. by N., and, after sailing 14 miles N. by W., it bore S. E. Required the distance of the yacht from the lighthouse at both stations.

SOLUTION. — Describe the compass E. S. W., and let its centre X represent the place of the yacht at the first station; draw the N. by W. line, X Y, equal to 14 miles, and Y will represent the second station.



Draw the line E. by N., X Z, of an indefinite length, and the line Y Z parallel to the S. E. and N. W. line of the compass: the point of intersection Z will represent the place of the lighthouse, and the distance Y Z, being measured by the same scale of equal parts with which the 14 miles of course is laid off, will be found to be $16\frac{3}{4}$ miles, and X Z $9\frac{1}{4}$ miles.

USE OF THE CHARTS.

Charts can be purchased, at a very reasonable rate, of all the important harbors and the whole coast-line of the United States. They come nicely backed with cloth, so as to stand considerable hard sea-usage. They should be kept, when not in use, rolled up in a large tin box made for the purpose, or a long, narrow wooden trunk, called a chart-box.

In using charts, *great care should be taken to see whether or not the courses laid down to be sailed are magnetic ones; that is, with the variation of the*

compass allowed. Such is usually the case; but there are charts made where the variation of the compass must be allowed to make the courses true.

Always carefully read all the notes upon the margins of a chart: one will often run across an item of the greatest interest or importance. Nearly all charts of harbors and the coast-line will be found with two scales of miles upon them; one being marked *statute miles*, and the other *nautical miles*.

Now, the difference is this, the scale that is marked statute miles means a mile of 320 rods of 16½ feet each, or 1,760 yards of 3 feet each, or 5,280 feet; whilst a nautical mile means the sixtieth part of a degree of the earth's surface measured at the equator, which is about 6,086.4 feet in length.

SOUNDINGS

Are very regular upon the American coast; and if the time of tide be known, and the note concerning soundings, on the margin of the chart, consulted, one can often, when caught in a fog, tell quite correctly the position of the yacht, its general place upon the chart being known.

The Lead-Line. — For the purpose of getting soundings, the lead-line must be used, of which there are two kinds, — the *dipsey lead*, i.e., the deep-sea lead, and the hand lead. The deep-sea lead consists of a lead sinker, usually about twenty-five pounds in weight, the lower part of which is hol-

lowed out, and filled with tallow, when it is said to be *armed:* this is for the purpose of bringing up a specimen of the bottom which it strikes upon in its descent, often thus aiding the navigator in determining his position. The line to which this lead is attached is coiled up in a half-barrel or tub, and is usually a hundred fathoms in length, a fathom being six feet. It is generally as large as one's little finger, and is laid up in what sailors call a "left-handed coil," the opposite to most other ropes in common use. It is marked up to twenty fathoms in the same manner as the hand lead-line, and then one knot for every ten fathoms, and a strip of leather for each five fathoms. The manner of casting the deep-sea lead is to bring the yacht to the wind, and as nearly stationary as possible, when the lead is taken by hand outside of all the rigging, forward on the weather-side, the tub remaining aft; the person forward then casts the lead as far as possible ahead of the yacht, singing out at the same moment, "Watch! Oh, watch!" and the person aft at the tub allows the line to be taken out by the lead in its descent as fast as possible; and when it reaches the bottom he hauls it carefully up till his hand hits upon the knots, the number of which determines the depth; the yacht is then kept on her course, and the line hauled in over the stern, and coiled down in the tub, as it comes in, for immediate use again. When the lead

arrives on deck, it is unbent from the lead-line, the arming examined and scraped off, ready for a new cast.

Heaving the Hand Lead. — The hand lead is used in a different manner, and is the most perfect instrument yet devised to warn the yachtsman or sailor of unknown dangers and the rapid shoaling of the water, or approach to some unknown or unexpected shoal.

Custom has, from time immemorial, marked the lead-line in a peculiar and, the writer does not hesitate to say, ridiculous manner, which can be understood by the initiated only. But that it may be done according to "Gunter," and in "ship-shape and Bristol fashion," the following explanation is given : —

Heaving the lead is done usually by a person who is placed in the main-chains for that purpose, on the weather side, or, in smaller craft, on deck, forward, just clear of the shrouds. It is thrown whilst the yacht is under way, and being kept on her course, and the results announced in a singing voice by the one casting ; and, when the water becomes too shoal, the yacht is put about, and stands off from the danger which she was approaching. The one casting the lead takes hold of the line at about a fathom from it, and swings it to and fro till enough velocity is gained to swing it over his head ; when at the right angle it is released, and flies for-

ward in the air, striking the water far in advance of the yacht and the bottom, before the yacht reaches the place where it struck the water, so that the line may be kept perpendicular for a moment from the yacht to the bottom of the sea, and the distance measured by means of marks upon the lead-line, which are as follows: —

At	1 fathom	one knot.
	2 "	two knots.
	3 "	three knots.
	4 "	nothing.
	5 "	a white rag.
	6 "	nothing.
	7 "	a red rag.
	8 "	nothing.
	9 "	nothing.
	10 "	leather with one hole.
	11 "	one knot.
	12 "	two knots.
	13 "	nothing.
	14 "	nothing.
	15 "	white rag.
	16 "	nothing.
	17 "	red rag.
	18 "	nothing.
	19 "	nothing.
	20 "	leather with two holes.

Those that are marked are called "marks," the others, "deeps;" and a lead-line as above consists of eleven "marks" and nine "deeps."

If the mark of three fathoms is near the surface

of the water, the caster sings out, "By the mark three!" or, if such be the case, "By the deep eight!" and, should he consider the depth to be a quarter or half more than any particular number, he sings out, "And a quarter six!" or, "A half five!" &c. If the depth is estimated to be three-quarters more than any particular number, he calls it a quarter less than the next higher number; thus, at two fathoms and three-quarters, he sings out, "A quarter less three!"

For all practical purposes a lead-line twenty fathoms in length, but marked only to ten fathoms, will be the most useful for yachts and small sail-boats. This line should be marked as follows: —

At 1	fathom	one knot.
2	"	two knots.
3	"	three knots.
4	"	four knots.
5	"	white rag.
6	"	six knots.
7	"	red rag.
8	"	blue rag.
9	"	nothing.
10	"	piece of leather.

A small piece of white rag may also be inserted at the half-fathoms between two and three.

EIGHT BELLS, AND WATCH AND WATCH.

Time at sea is divided differently than on shore; and the day commences at twelve o'clock, noon.

The reason of this is, that at that time usually, at sea, the navigator determines and ascertains the position of the ship, hence the true time; and the clock is corrected from the difference in longitude from noon of the preceding day.

The time of twelve o'clock is denoted by striking the vessel's bell eight times in a peculiar manner, thus: by sets of twos, one, two, rapidly following each other, then a pause of three or four seconds, and then the next set of twos, thus: one, two — one, two — one, two — one, two; whilst seven bells would be struck thus: one, two — one, two — one, two — one, two — one; and three bells: one, two — one; four bells: one, two — one, two.

This system of eight strokes of the bell does for the whole twenty-four hours, each stroke denoting one half-hour: hence eight bells cover a space of four hours, which is termed a watch, and, if each watch was four hours long, of course there would be six such watches in the twenty-four hours; and the crew, divided as they always are into starboard and port watches, would, during the whole voyage, have just the same hours on deck. That is to say, the starboard watch would come on deck at twelve o'clock noon every day of the voyage, and stay till four P.M.

This would not be fair to the other watch; and to avoid this repetition, and to divide the time differently each day, the hours from four to eight in the

afternoon are divided up into what are called *dog-watches* of two hours each, which breaks up the daily regularity, and changes the hours; so that the starboard watch who happen to be on deck from twelve to four P.M. one day are the next day below during the same hours, and the port watch on deck; and thus the same watches come round every forty-eight hours. After the bell is struck at twelve noon by order of the navigator or sailing-master, the time will be kept as follows: —

12.00	o'clock, noon	. . .	8 bells.	
12.30	" P.M.	. . .	1 bell.	*Afternoon-Watch.*
1.00	" "	. . .	2 bells.	
1.30	" "	. . .	3 "	
2.00	" "	. . .	4 "	
2.30	" "	. . .	5 "	
3.00	" "	. . .	6 "	
3.30	" "	. . .	7 "	
4.00	" "	. . .	8 "	
4.30	" "	. . .	1 bell.	*First Dog-Watch.*
5.00	" "	. . .	2 bells.	
5.30	" "	. . .	3 "	
6.00	" "	. . .	4 "	
6.30	" "	. . .	5 "	*Second Dog-Watch.*
7.00	" "	. . .	6 "	
7.30	" "	. . .	7 "	
8.00	" "	. . .	8 "	

8.30	o'clock,	P.M.	1	bell.
9.00	"	"	2	bells.
9.30	"	"	3	"
10.00	"	"	4	"
10.30	"	"	5	"
11.00	"	"	6	"
11.30	"	"	7	"
12.00	"	midnight	8	"
12.30	"	A.M.	1	bell.
1.00	"	"	2	bells.
1.30	"	"	3	"
2.00	"	"	4	"
2.30	"	"	5	"
3.00	"	"	6	"
3.30	"	"	7	"
4.00	"	"	8	"
4.30	"	"	1	bell.
5.00	"	"	2	bells.
5.30	"	"	3	"
6.00	"	"	4	"
6.30	"	"	5	"
7.00	"	"	6	"
7.30	"	"	7	"
8.00	"	"	8	"
8.30	"	"	1	bell.
9.00	"	"	2	bells.
9.30	"	"	3	"
10.00	"	"	4	"
10.30	"	"	5	"
11.00	"	"	6	"
11.30	"	"	7	"
12.00	"	noon	8	"

First Night-Watch.

Second Night-Watch.

Morning-Watch.

Forenoon-Watch.

In cases of emergency, usually to take in sail, whether by night or day, "All hands on deck to take in sail, ahoy!" "Heave up my hearties!" is bellowed into the forecastle, and comes to the ears of the unwilling sleepers of the watch below.

BOXING THE COMPASS

Is the term used for repeating the thirty-two points of the compass-card by memory from the right hand to the left, (and then back again,) commencing at north, and proceeding to north by east, north, north-east, &c. It is necessary that the amateur and young salt should acquire this, if he desires to ever be able to make use of the most simple problems in boat-sailing, the use of the charts, the finding of the position of the yacht by cross-bearings, &c. In fact, it is indispensable; and the task should be commenced at once. It should not be gotten by rote, without rhyme or reason; but, in repeating the names of the points, *the compass-card, or a printed imitation of it, should always be kept before the eye.*[1]

After acquiring the regular thirty-two points, the subdivision of quarter and half points are to be gone into. The smallest division used in navigation is a quarter of a point; thus your course may be N. by E. $\frac{1}{4}$ E., or N. by E. $\frac{1}{2}$ E., or N. by E. $\frac{3}{4}$ E.; but no smaller subdivision is ever made between two courses than one-quarter of a point. This is as near

[1] See frontispiece.

as the yacht can be kept to her course, and is as near as the eye can line a course in an observation for cross-bearings. If, however, one desires more minuteness, it may be well to state that each point of the compass contains 11° 15′, or 360° for the whole thirty-two points. The names of the points of the compass, commencing at north, and going towards east, are as follows. The *principal points*, as they are called, which are marked larger than the others on the compass-card, are here designated by capitals.

1. NORTH	N.
2. North by east	N. by E.
3. North, north-east	N.N.E.
4. North-east by north	N.E. by N.
5. NORTH-EAST	N.E.
6. North-east by east	N.E. by E.
7. East, north-east	E.N.E.
8. East by north	E. by N.
9. EAST	E.
10. East by south	E. by S.
11. East, south-east	E.S.E.
12. South-east by east	S.E. by E.
13. SOUTH-EAST	S.E.
14. South-east by south	S.E. by S.
15. South, south-east	S.S.E.
16. South by east	S. by E.
17. SOUTH	S.
18. South by west	S. by W.
19. South, south-west	S.S.W.
20. South-west by south	S.W. by S.
21. SOUTH-WEST	S.W.

22. South-west by west	S.W. by W.
23. West, south-west	W.S.W.
24. West by south	W. by S.
25. WEST	W.
26. West by north	W. by N.
27. West, north-west	W.N.W.
28. North-west by west	N.W. by W.
29. NORTH-WEST	N.W.
30. North-west by north	N.W. by N.
31. North, north-west	N.N.W.
32. North by west	N. by W.

If any one desires to be *very salt,* he will pronounce these points as follows: —

Nor', nor'-west	N. N.W.
Noothe by east	N. by E.
Sou' by west	S. by W.
Sou', sou'-west	S. S.W.

And, in fact, the above is the way that they are pronounced by all sailors.

It should be remembered that the *compass does not move;* that is to say, the yacht moves, which seemingly makes the card in the compass-box revolve. It is absolutely an optical illusion to "land-lubbers;" and except by the jar of the yacht, or by pitching about in a heavy sea, the compass-card does not revolve, but is stationary, and it is the change of the course of the yacht which seems to give it motion.

TO PLACE A COMPASS TO STEER BY.

The periphery of the circular casing in which the card revolves should be marked plainly with a perpendicular black line; and this black line should, by moving the compass-box, be brought to bear in a direct line with the keel of the yacht, and the box secured in that position. One has then only to move the helm to bring each and every point on the compass-card opposite to this black mark on the compass-box, and, having once brought the point needed to this position, keep it there by moving the helm when necessary; and this act of keeping it there is called "keeping the vessel on her course."

For instance: if the wind allows, suppose by the chart it is desired to steer N.E., to reach a certain place. Go on deck, and, by moving the helm, bring the N.E. point of the compass-card opposite to the black perpendicular mark on the compass-casing, and keep on your way, after having trimmed your sails so as to hold the wind properly. The yacht will not keep on N.E. exactly, but will yaw to and fro, *which will seem as if the compass-card was moving;* and this will occur more or less according to the roughness of the water. And, if one looks too much to the compass, the yacht will be off the course before the compass shows it: it is therefore well, if possible, to get some bearing,

miles ahead, that cuts the weather-shrouds or jib-stay, when the yacht is on her course; then, by looking at that, one can easily see when she is off her course, casting an eye to the compass once in a while. In the night-time very fine steering can be done by picking out a star, and steering by it, after getting it to range on some part of the yacht. Steering by a compass is a great accomplishment: few amateurs do it well. It used to be said at sea, that the best helmsmen *looked at the head of the vessel* oftener than the compass, and were thus enabled to check with the helm any disposition of the vessel to leave the true course, long before the departure was shown by the compass-card.

VELOCITY OF WIND.

Generally speaking, a wind that blows sixteen miles an hour is called a fresh breeze. One that blows eighteen miles an hour calls for a single reef; and twenty miles, a close reef. Twenty-four miles an hour is a gale; whilst thirty miles an hour is a fresh gale.

THE LOG, REEL, AND HALF-MINUTE GLASS.

This method of ascertaining how fast the yacht is moving through the water, and hence to calculate her position, has been almost done away with by the use of what is termed the "patent log," which is now almost universally used, and which consists of

a small propeller of brass, which is towed astern, and records its own revolutions on dials. But, to enable one to use the common log-line and glass, the following description is written: The half-minute glass is of the same form as an hour-glass, and contains such a quantity of sand as will run through its neck in twenty-eight seconds of time; or a watch with a second-hand may be used, if the glass is not handy. The *log* is a piece of thin board of a quadrantal form, about the size and shape of a quarter-section of the bottom of a common water-pail, loaded on the circular side with enough lead to make it swim upright in the water. To this is fastened a line, about one hundred and fifty fathoms in length, called the *log-line*, which is divided into intervals called *knots*, and is wound on a reel which turns very easily.

To ascertain the velocity at which the yacht is sailing is called *heaving the log*, and is performed as follows: one person holds the reel, and another the half-minute glass, whilst a third throws the log over the stern on the lee side; and, when he observes that the stray line has run off (which is about ten fathoms), and the first mark (which is generally a red rag) has passed the stern, he sings out, *Turn:* the glass-holder answers, *Turn*, and, watching the glass, the moment it has run out, sings out, *Stop*. The reel being immediately stopped, the last mark run off shows the number of knots that

the yacht has sailed during the last hour, if the wind has been constant.

The log-line is marked as follows: allow ten fathoms for stray line, and then insert a red rag, and at every 47.6 feet mark the line as follows: at one, one leather; at two, two knots; at three, three knots; and also have a small mark at each half-knot, and so on to ten and twelve knots.

The principle of the log-line is, that a knot is the same part of a sea-mile that half a minute is of an hour: therefore the length of a knot should be one hundred and twentieth the length of a sea-mile, or fifty-one feet; but, as it is more convenient to have the knot divided into eight parts of six feet each, the proportional reduction is necessary in the half-minute glass.

BUOYS.

In entering harbors, the *red buoys* are to be left upon the starboard hand, and the *black* buoys upon the port hand.

MAN OVERBOARD.

Throw overboard at once any light object that will float, such as a stool, oar, boat-hook, or life-preserver, for him to grasp; then bring the yacht at once to the wind and heave her to, and pick up the man with the tender, or by going about and standing for him. *Don't look out astern for the man where he disappeared*, but out on the beam, which will be his position when the yacht is brought to the wind.

CHAPTER VII.

PRACTICAL HINTS ON BOAT-SAILING.

REMEMBER, in the first place, that no small boat fit to be called a sail-boat can capsize, unless the sail is confined by the sheet being made fast.

If the sail is loose, and the boom, or lower leach of the sail, as the case may be, can move in a direction parallel to the wind, or in the "wind's eye" as sailors would say, the boat cannot be upset by an ordinary gust of wind.

In other words, in all fore-and-aft sails, such as are used almost the world over for small sail-boats, the sheet, or rope that confines the after-part of the sail to the stern-part of the boat, is the key to the whole science of boat-sailing.

If one knows how to use the sheet properly, one knows how to sail a boat with comparative safety. Of course it is supposed that he should also understand flaws of wind and their effects.

It is the flaws of wind caught by the sail — more than it can bear — that capsize a boat; and, if the

wind that has force enough to do this could be "spilled" out of the sail, the boat would be immediately relieved.

Therefore to insure safety, the person steering a boat should never belay the sheet, but keep it in hand, so as to be able to slack it off gradually, or cast it off entirely at a moment's notice. To do this, only one turn should be taken round the cleat; so that the sheet will slip under the force of a gust of wind, when the hand retaining it in place slackens it in the slightest degree.

If the whole sail points towards the wind's eye, it no longer has any effect upon the boat. The sail then shakes in the wind exactly as a flag does from the top of a flag-staff, the wind passing by on both sides. Should the sheet be hauled aft, the sail would be filled with wind upon one side, and, if the wind had strength to overcome the gravity of the boat, capsize her.

Or, if the boat is so heavy ballasted that its gravity cannot be readily overcome, the mast or sail are liable to be carried away, and danger incurred on account of the towing mast and sail. These would most likely draw the boat into the trough of the sea, where she would be swamped almost instantly.

It does not follow, because the slacking of the sheet is a safe thing to do, that it should always be done. With boatmen who are thoroughly practised, it seldom is done; for they can obtain the

same result with the rudder by bringing the boat into the wind until the sail shakes, with the sheet still fast. This gives more control of the boat than would be the case if the boom were out to leeward, perhaps dragging in the water, on account of the pressure of the wind upon the hull and mast.

The very best thing to do in a sudden squall is to use a modification of both these methods; i.e., slack off the sheet for a foot or two, so that the sail, before it can fill with wind, will be at such an angle with the hull, that the shock upon the latter cannot be great. This gives one more command of the boat, and insures quicker movement of the hull, and hence quicker obedience to the helm, should a sudden change occur. This slacking of the sheet also prevents the boat from going about on the other tack, should she be brought too suddenly to the wind.

With an experienced hand at the helm, unless the squall is very severe, there is no need of luffing so as to shake the sail to any great degree. The slightest movement of the tiller will keep the sail just quivering in the wind, the boat still advancing, so that she will not lose steerage-way; thus enabling one to at once luff up nearer to the wind, or change the boat's position rapidly, should the wind, which is often the case, shift its direction suddenly.

Nothing is of more importance than to keep steerage-way on the boat, as it is only in the ut-

most emergency that the sheet should be slacked wholly off, and the headway lost.

If the boat is well under command when the squall is seen advancing, then the method of steering into the wind's eye may be safely adopted, and is, in fact, the better and more seamanlike method.

In small sail-boats on ponds, or arms of the sea, when a thunder-shower is coming up, — which can always be seen in time, — it is, as a rule, much the safest plan to take the boat as quickly as possible towards the nearest harbor or land, unless rocky, inaccessible, or dangerous; in which case, furl all sail and let go an anchor, paying out such a scope of cable that the boat will ride easily. Then wait for the coming blast.

However severe it may be, the thunder-gust can then do no harm. With an oar you can head the boat towards the coming blast, so that she will feel but little of its force, and prevent the dragging of the anchor.

Thunder-showers are particularly dangerous, however, from the fact that they almost always make their way directly against the prevailing wind. When the two winds meet, and one finds one's self in the vortex between them, it is very difficult to command a boat. Each wind, fighting for the supremacy, will fill the sails with gusts, for which one does not more than have time to prepare before

a counter-gust will throw them aback, or violently to the opposite side of the boat. Often, in fact, the wind, blowing a gale all the time, will in less than five minutes have visited every point of the compass. An anchor down and a furled sail are the best for all small, open, or half-decked boats or yachts in such an emergency.

Boats are often capsized by persons on board suddenly scrambling to the windward, or upper side, when a squall buries the lee gunwale in the water. Should the boat at this moment be taken aback by a counter squall or flaw, she will almost surely capsize, for in one moment the windward side becomes the leeward side; and the mass of weight hanging to what was, a moment before, the weather-side, will carry the boat over. It is too late to try and struggle back again: the bodies are all in the wrong position to be able to turn around inboard towards the centre of the boat. In their helpless postures they face the waves that are ready to devour them.

The safest position in an open boat, when preparing for an approaching squall, is, for all except the helmsman, to sit down in the bottom of the boat, as near the centre as possible, thus being safe from any blows from the boom of the sail, and increasing the steadiness of the boat in a marked degree. Here they act as ballast, and do much good in keeping the boat upright.

To the above knowledge should be added also the science of reefing the sails of a boat quickly and neatly, so that she will stand up under a great pressure of wind.

The mistake most frequently made is to neglect to reef till it is too late. Landsmen scarcely ever calculate how quickly wind moves, and how suddenly a change in the weather takes place. It is easy to reef while there is time, but sometimes almost impossible if too long delayed. Reefing saves one from much anxiety. The boat that with her whole sail would be cranky and dangerous plunges along buoyantly through the summer gale when her sails are properly reefed.

With a thorough knowledge of the sheet and rudder, and how to reef a sail, there ought to be no accidents, even in very small boats; but the trouble is, that too many tyros are allowed to invite unsuspecting ladies and young girls into their boats, they not understanding the first rudiments of a real nautical knowledge, of how to manage a craft in times of danger.

A boat is like a good horse, — it will always do the best it can. It will not capsize if it can help it; but, if mismanaged in time of emergency, it is a dangerous plaything. Properly handled, it is amazing, almost incredible, what can be done with a small open boat, with a common lug-sail, and what weather it will live through.

But without knowledge, and knowing just what to do in dangerous times, this pleasant summer sail is a treacherous pastime.

CHAPTER VIII.

A SHORT CRUISE WITH A SLOOP-YACHT, ILLUSTRATING THE COMMON SEA-MANŒUVRES.

"WELL, uncle Charley, when are you going to give me a sail in your yacht? You know, that, although I have sailed a little, I look forward with the greatest impatience to a trip with you; so that I may become posted in all respects, and finally turn out a first-class sailor."

"Your ambition is a worthy one, Tom; and I am willing to gratify it. But it is yet very early in the season; and I am afraid that we shall encounter some dirty weather, should we attempt now to make a trip."

"Well, that is the very thing that I want to encounter," said Tom. "Besides, you have quite a large yacht, and every thing in apple-pie order; whilst I only have a little bit of an open boat at my home, and really know but little of the science of boat-sailing, and nothing of the technical language or discipline of a well-appointed vessel."

Thus spoke Tom Coffin, a young man of some seventeen years, who was on a visit to his uncle, Capt. Charles Coffin, a middle-aged retired sea-captain, who knew a vessel from her stem to her stern, and who retained his youthful passion for the water, and enjoyed himself thoroughly during the summer months in his beautiful yacht "Nancy Lee."

"By the way, uncle Charley, you have not told me any thing yet about your yacht; and you know I have never seen her. How large is she?"

"She is about thirty feet over all," said his uncle.

"How is she rigged? Tell me all about her, uncle, won't you?

"Well, the 'Nancy Lee' was built two years ago, and is what is called a 'centre-board sloop;' that is, she is shallow, and broad of beam, and is rigged as a sloop. She has a good comfortable cabin, and sound spars, and strong and durable canvas, and good ground-tackle, and I think she will compare favorably with any of her class. She is not so fast as some, being, as I said, of good beam, and her spars and sails are not too large for rough weather; but I consider her a first-class boat for outside work, safe, strong, and easily managed."

"How many crew do you carry, uncle Charley?"

"Well, as a general rule, I have only Bob Stevens with me, who made, if you remember, many voyages to sea with me, and is a true, able seaman

in every sense of the word. He usually keeps the 'Nancy' in order for me, and acts as 'cook and all hands;' although, when I am going on a cruise of a week or two, I usually take with me also Widow Tompkins's son, who is smart and active, and who, if he will only take a voyage round the Horn, will, I prophesy, yet turn out a good sailor. But you shall take his place."

"Is the yacht all ready now?"

"Oh, yes!" replied uncle Charley. "She has been at her moorings the last two weeks. But I thought I would give you a day or two to get over your journey before speaking about a cruise; but I see that young blood will not be restrained."

"And have you every thing on board ready for a cruise?" asked Tom.

"Yes, every thing," replied his uncle; "for, being an old sailor, I like to have every thing prepared. Now, on board the 'Nancy Lee' you will find, I will be bound, every thing that is needful for a craft of her size; such as compass, charts, signal-lights, barometer, lead-line, log, and all that is needful to handle her in a seamanlike manner in all weathers."

"Well, uncle, when will you start? Have you provisions on board?"

"Every thing is on board; and, as you have inoculated me, I suppose we might as well get under way to-morrow morning on the young ebb: so take

yourself up aloft, young man, and 'turn in,' and be prepared to turn out at about one bell in the morning watch; and I will go down to the landing, and see that Bob has every thing in ship-shape."

. . . . . .

"Come, rouse out, youngster! it is past one bell," sang out the cheery voice of uncle Charley at Tom's door the next morning; and hurrying on his clothes, and taking a small valise filled with a change or two fit for sea-use, he was soon by his uncle's side.

"Well, it is going to be a lovely morning, if it is only the 10th of May," said Capt. Coffin.

"Why, how do you know, uncle Charley? It is as dark as pitch yet."

"Well, my boy, when you are as old as I am, you will know how, by many signs, to forecast the weather, even in the night-time. But let us hurry along, and get on board, as I want to take advantage of this ebb to get outside before the flood makes."

Arriving at the landing, the following conversation took place: —

"'Nancy,' ahoy!"

"Ay, ay, sir!"

"Is that you, Bob?"

"Yes, captain."

"Come ashore in the tender, and set us on board!"

"Ay, ay, sir!"

The small boat soon reached the landing; and our friends were soon alongside the "Nancy Lee," and quickly on board.

"Now, Bob," said Capt. Coffin, "have you got hot coffee and biscuit ready?"

"Yes, captain, all ready, and humming hot on the stove."

"Well, then, we will go below, Bob, and you can serve it in the cabin; for it is well to get something hot down before facing this damp morning air."

After each had drunk a good hot mug of strong coffee without milk, and eaten a good large sea-biscuit, Capt. Coffin and Tom appeared again on deck, and preparations were made to get under way.

"Have you got the stops off of the mainsail, Bob?"

"Yes, captain: they are all off."

"Then go forward, you two," said Capt. Coffin, "and hoist away the mainsail. You take the peak-halliards, Tom; and you the throat, Bob. That's the way! Up she goes! [Cheerily.] Avast, there, Tom! you are hoisting too fast on the peak, and have jammed the hoops round the mast, so that Bob can't get an inch on the throat-halliards. Slack away a little! Handsomely: there, that will do! Now hoist away. Belay the peak-halliards! Now go over and take in the slack, whilst Bob swigs off on the throat-halliards: that will do. Belay!

Now over to the peak, and stand by to peak it up, whilst I let go the main-sheet, and lift up the main-boom. So! That will do. Belay! Now coil the halliards down snug, and lay aft here, Tom, and tend the jib-sheet. — Are the gaskets off the jib, Bob?"

"Ay, ay, sir! All off!"

"Then let go your downhaul, and run her up!

"Now, Tom, I want to cast to starboard; and, as the yacht is now lying head to wind, when Bob has the jib up, I want you to trim down flat on the port jib-sheet, and hold on till I tell you to let go. — Now, Bob, is that jib chock up?"

"Yes, captain."

"All right, then; slip your moorings, and let her slide! Haul aft the port jib-sheet, Tom; and lay aft here, Bob, and help shove this boom out to starboard, whilst I put the helm to port. There, she pays off all right! Down with the centre-board, Bob! — Let go the jib-sheet, and trim down to starboard, Tom! That will do. Belay!

"There! Don't she move through the water well? Just a nice working-breeze. And see the glimmer of the breaking day over there to the eastward! I wonder if we can fetch by Rouse's Point without going about. I fear not; but we shall see long before we get there. There is plenty of time.

"Now, Tom, do you see that little light on shore, just forward of the weather fore-rigging? Come and stand just where I am, and see if you see it."

"Yes, uncle, I see it all right."

"Well, take the helm, and keep her just as she goes, with that light cutting the weather-rigging, as a course. She steers like a pilot-boat, and you will have no trouble. — Bob, keep a good lookout there forward, whilst I go below to have a look at the chart."

"Ay, ay, sir!"

"Now, Tom, I have looked carefully at the chart, and I know this harbor well; but the wind is so scant, that I am afraid that we shall not be able to lie by Rouse's Point without going about; and I had rather do it now than when we get farther down, and nearer to the point, for there are some bad rocks make off: so I think that we will go about to make all sure.

"Ready about!

"Come aft, Bob, and tend the lee jib-sheet! —And you look out for the weather one, Tom! All ready! Hard a-lee! Let go the jib-sheet! Avast hauling, Tom: you are too quick! — Trim down, Bob! — Now let draw, and trim down flat, Tom, and belay! There, she begins to trot again! We can't stand very far in this direction; for we are crossing the channel at about right angles, and it is not more than a mile and a half wide hereabouts; and I don't want to be picked up by any of these flats on an ebb tide, and don't mean to; and yet I want to stand over just as far as I can, so as to clear Rouse's

Point on the next tack. There comes the daylight at last! Is it not a beautiful sight, Tom? — Come, Bob, jump below, and get up the hand lead, and give us a few casts from the weather-rigging.

"Are you all ready?"

"Ay, ay, sir!"

"Then cast."

Bob. — And a quarter less five.

"That is plenty of water; isn't it, Tom? But then you can't be too careful, and there is nothing like the lead. We only draw eight feet and a half with the centre-board down, and only three and a half with it up: so we have little to fear yet. Keep casting, Bob!"

Bob. — By the deep, four!

"There, you see Tom, we have already commenced to shoal our water."

Bob. — And a quarter less three!

"Still shoaling, and pretty fast too."

Bob. — And by the mark, two!

"We are getting well over, Tom; but we will have a cast or two more from Bob."

Bob. — And a quarter less two!

Bob. — And a half one!

"Ready about!

"Hard a-lee!

"There, Tom, you did better with your jib-sheet that time, and did not try to haul it over too quick, and before Bob had trimmed it down again to make her pay off.

"See, Tom, the day is breaking fast, and there is Rouse's Point well on our lee. If the wind holds, we shall not have the slightest difficulty in passing it on this tack. And now, as we are going to make a long leg, we will let Bob go below and get breakfast ready. Do you think you can eat any thing, Tom?"

"Yes, uncle, I think I can; but this is just splendid. But tell me, why do you trim down the jib again on the same side, after letting it go? Would not the yacht come about without it?"

"Yes, she would," replied Capt. Coffin, "easily; but I wanted you to see how a craft should be put about in a seamanlike manner, and how she would have to be put about in heavy weather. It is well to know how to do a thing well, and what will be necessary in times of emergency."

"Thank you, uncle: I shall remember. Is it not a lovely morning, and how nicely we are slipping along! I think I could eat a piece of whale's blubber, I am so hungry."

"Are you, Tom? Well, so am I. But here comes Bob up the companion-way, to say that breakfast is ready.

"Now, Bob, keep her full and by; and, if she breaks off any, call me at once, for we shall have to go about again.

"Let's get below, Tom, and get our breakfast; for I must not be long below till we get well outside.

"Is this not a snug little cabin? and haven't I got things handy around me? I like to have things where I can put my hand upon them quickly.

"If you have finished, we will go on deck again.

"Well, Bob, has she held her course?"

"I don't believe she has changed it a pint, Capt. Coffin."

"Well, go below and get your breakfast, and clear things up. We will look out for her. In an hour or two we shall be out in the sound all clear."

"See, uncle, how we have gained upon that fishing-schooner! Are we not going to pass too near him? He evidently is beating out as well as we."

"You are right, Tom. If we should keep on, there would be a collision; but as we are on the port-tack, and the fishing-schooner on the starboard-tack, and both of us close-hauled, he has the right of way; and it is therefore for that reason that I gracefully ease off the main-sheet, as you see, and keep her off, so as to pass under his stern, whilst he passes saucily on his course and to windward. But it is his right, and we must not hesitate. When we are on the starboard-tack, we will demand our rights just as strongly."

"I am afraid after all, uncle Charley, that it is going to be rough; is it not? The day is not as pleasant as it was an hour ago, and it seems kind of overcast and cloudy to windward."

"Yes, Tom: the weather does look a little dirty

to windward, but nothing to speak of; but, as you started to see some fun, I hope that you will see it."

"How far do you call us now from the land?"

"Well, I should say that we were a good ten miles from the southern light. I can tell you exactly by cross-bearings, if you really want to know very much."

"No, uncle, I do not care enough to give you that trouble; and, besides, I only wanted to know about how far off you estimated it. We must be going through the water pretty fast, as she is well heeled over."

"Yes, she is jumping along now, and the wind and sea are both getting up fast. I think that I shall take in a reef.

"Never be ashamed, Tom, of reefing early: it is a simple matter if undertaken in time; but, if neglected too long, is a difficult, and at times a dangerous job.

"In the first place, you and Bob get hold of that tender, and draw her up on the lee-side, and get her aboard forward, where she belongs, and lash her down. Don't get overboard!

"Be careful of the rail, Bob: don't chafe it. Now lash her down snug, and, as soon as you are ready, man the jib-halliards and downhaul. All ready?"

"Ay, ay, sir!"

"Then let go the jib-halliards. Down with it,

Bob!—Lend a hand on the downhaul, Tom! There, that will do! Make fast!

"Stand by the throat and peak halliards! lower away! That will do. Well of all. Belay! Come, lay aft here, and bowse out on this reef-pennant! That will do! Lay out on the boom, Bob, and pass this earing! All fast?"

"All fast, sir."

"Then come in and get another earing for the luff, Bob, and hurry up!

"That's the talk; make fast! Now tackle the reef-points, and knot as fast as you can. Now lay forward, and off with the bonnet, off the jib! And sing out when you are ready.

"Now lay aft, and hoist up the mainsail! That will do. Belay! Now up with the jib!

"There, off we go upon our course again. Do you see how much better she stands up to it, Tom? and how much better weather we are making? I don't like the looks of things to windward, however; and I guess that we will square away for a harbor that I know on the other side of the sound, unless you would like to heave to out here, and ride it out. But we should make nothing by that, and we may as well get in smoother water as to jump about here; for it is coming on to blow fresh, if I know any thing about weather. My barometer is falling too, which is also a warning sign.

"Here comes an extra puff, rather more than we

can stand even with this reef in; but you see, by shaking her up into the wind, I have allowed all its force to pass us without damage.

"Well, I think that we have had enough of this: it is cold, and the water that we are taking on board will soon chill us more. Here goes for squaring away before it!

"Stand by the main-sheet and jib-halliards!

"Ease away on the main-sheet, Tom! handsomely! Keep a good turn! Don't let it get away with you. That will do!—Ease off the jib-sheet, Bob! Make fast!"

"All fast, sir!"

"Why, uncle Charley, what a change! I should think there was scarcely any wind at all."

"Yes, that is a most common impression when a craft is kept off before the wind after pounding into it; but you should not be deceived. Now is the time that you must pay great attention to the helm; for the waves lift the stern so far out of the water, that the rudder acts, as you see, in an irregular and unequal manner, causing me to meet her as she yaws with a quick movement of the helm. I don't like the looks of the weather at all.

"Look out! Hold on, everybody! There, that sea has pooped us, and we are all afloat! This will never do.

"Stand by to haul aft the main-sheet! We must shake out this reef, Bob, if it is blowing fresh,

so as to go faster before the wind, and not get pooped again."

[The reef is shaken out, and the yacht again kept away.]

"There, Tom! see how she runs away from those large seas, now! No more danger of their coming on board again.

"You see, the tide was against us, and the wind astern; and the 'Nancy' moved too slowly forward to escape those big fellows. This is one of the times that it is good seamanship to clap on more sail, although the sea is getting up. If we should haul on a wind now, we should need two reefs in; but, running before it, she is doing very well.

"There is the headland that we shall have to leave on the port-side. Do you see it, Tom? We shall have to jibe before we can run in, and that is a manœuvre that must be nicely executed in such a sea-way as this. But we shall execute it all right, as you shall see.

"Lay aft here, Bob, and stand by the peak-halliards! Let go! That will do. Belay! Now clap on this main-sheet, and get it aft, steadily. Round it in!

"Keep a good turn at the cleat! Don't let the boom get away with you! Now slack the lee jib-sheet off, so that the jib can work itself. Now look out for the jerk when the boom goes over, and stand by to slack the sheet at once. Hand-

somely done! Slack away the main-sheet! Belay! There, that is a good job! Up with the peak! Belay!

"Go forward, Bob, and stock the second anchor; and bend on the cable, and have it all ready for anchoring; for we shall not find very much lee in this harbor till the wind shifts. But there is good holding-ground, and we shall be all right.

"As soon as we pass that lighthouse, Tom, and get in the bight of the bay you see ahead on the starboard-side, I shall round her to, and let go the anchors. There are two fishermen at anchor there now. Do you see them?"

"Yes, uncle, I see them; and they seem to be laboring pretty heavy."

"Yes. That is because they are loaded deep; but we shall ride like a bird.

"Haul down the jib, and stow it! Lend Bob a hand, Tom. Now come aft here!

"Stand by the anchor, Bob!"

"Ay, ay, sir!"

"Now you see, Tom, how I round her up under the stern of this fisherman, and bring her head to wind.

"Let go the anchor!"

"All gone."

"Don't check her too quick, Bob! Pay out! pay out! Now snub her, but not too sharp. Does she hold?"

"Yes, sir. She has brought up."

"Then let go the second anchor, and pay out on both. Give your cables plenty of scope. That will do. Make every thing fast.

"I can see by the land that she does not drag. But jump below, Bob, and hand me up the hand lead, that I may throw it over the side, and see that she is holding all right.

"There, Tom! don't she ride easily?

"Now down mainsail, and stow it, before it is slatted to pieces by the wind, and lash the helm amidships. We shall ride here like a Mother Carey's chicken.

"Now let's sound the pumps, and then we will go below, and take things easy till this wind moderates; have a good, nice dinner; and then we will proceed upon our cruise. Well, Tom, do you think you have smelt salt water, boy?"

"Yes, uncle; but I like it, though, and the way you manage, in spite of the elements. We have not started a rope-yarn, and are lying here as snug as a bug in a rug."

And thus we will leave them, wishing them good weather, and a pleasant ending to their cruise.

CHAPTER IX.

VOCABULARY OF SEA-TERMS COMMONLY IN USE.

ABACK. — A sail is said to be taken aback, when its forward surface is acted upon by the wind.

ABAFT. — The position, towards the stern, or hinder part of the yacht, from any stated point; as, "abaft the forecastle," "abaft the mainmast," "abaft the cabin."

ABEAM. — Any object is said to be abeam that bears at right angles to the line of the keel; and an imaginary line drawn at right angles across the keel, equidistant from the bow and stern, divides the yacht into two parts. Any thing bearing forward of this line is said to be "forward of the beam," and any thing bearing behind this line is said to be "abaft the beam."

ABOARD. — In the yacht; as, "Get the anchor aboard!" "Come aboard!"

ABOUT. — A yacht is said to "go about" when tacking, the order to prepare for which is, "Ready about!"

ABREAST. — Opposite to, as relates to the sides of a yacht; as, abreast of a lighthouse, when the side of the yacht is at right angles to it, or nearly so.

ADRIFT. — Broken loose from moorings; or any thing rolling about the decks loose in a sea-way is said to have broken adrift.

AFLOAT. — Clear of the bottom, sustained by the water.

AFORE — That part of the yacht nearest to the stem, or head.

AFT. — Behind; as, "Stand further aft," "Haul aft the main sheet!" i.e, bring the boom nearer the line of the keel

AFTER. — Hinder, as after-sails, such as the main-sail, in contra distinction to forward-sails, such as the jib.

AGROUND — Not having water enough for the yacht, which rests on the ground.

AHEAD. — Before the yacht; any thing in advance of where the yacht is being directed.

A-LEE. — The helm is a-lee when the tiller is put to the lee-side; "hard a-lee," when it is put over as far as it will go."

ALL IN THE WIND. — When the sails receive a portion of the wind on both surfaces, and shake or wave like a flag.

ALL HANDS, AHOY. — A summons used to call all the crew on deck in an emergency.

ALOFT. — Up above, at the masthead.

ALONGSIDE. — Close to the side of the yacht.

AMIDSHIPS. — Any thing in a line with the keel; viz., "Put the helm amidships!"

To ANCHOR. — To let the anchor fall overboard that it may hold the yacht; the order for which is "Let go the anchor!"

ANCHORAGE. — Ground fit to anchor on.

To WEIGH THE ANCHOR. — To heave it up from the bottom to the bow of the yacht.

ASHORE. — On land, aground.

ASTERN. — Behind the yacht.

ATHWART. — Across.

ATHWART-SHIPS. — Any thing lying at right angles to the line of the keel, or nearly so.

AVAST. — To cease pulling, to stop.

A-WEATHER — The helm is said to be a-weather when the tiller is put over to the windward side of the yacht; and "hard a-weather," when it is put over as far as it will go.

AWNING. — A canvas covering stretched overhead, to give protection from the heat of the sun.

BACK-STAYS. — Ropes fixed at the topmasthead, and fastened to the sides of the yacht to sustain the topmast.

BALLAST. — A quantity of heavy material placed in the hold of the yacht to give her proper stability.

BANDS. — Pieces of canvas sewn across a sail to strengthen it to sustain the reef-points, and called reef-bands.

BAR. — A shoal, usually found at the mouths of rivers and harbors that are subject to much current.

BARE POLES. — Having no sail up, on account of the severity of the wind; hence "scudding under bare poles," that is, running before the wind with no sail set.

BEAMS. — Pieces of timber across the yacht under the decks, bound to the sides by knees. A yacht is said to be on her "beam-ends" when she is hove down by any force, so that the ends of the beams point towards the ground.

FORWARD OF THE BEAM. — When the object or wind is at some position between abeam and ahead.

BEFORE THE BEAM. — When the wind or object bears on some point forward of the beam, but within the right angle formed by the keel and a line across the middle of the yacht.

ABAFT THE BEAM. — The opposite to Before the Beam.

BEARINGS. — The direction of any object by observation of the compass; also to any object, as the lighthouse bears abaft the beam.

BEATING TO WINDWARD. — Advancing in the direction from which the wind proceeds by a series of manœuvres called "tacking."

BECALMED. — Having no wind to fill the sails. One sail is also said to becalm another when the wind is aft.

BELAY. — To make fast a rope around a cleat or pin.

To Bend. — To fasten; as to bend the sails, bend on the cable to the anchor, bend on the colors, &c.

Bight. — Any *slack* part of a rope between the ends.

Bilge. — The flat part of a yacht's bottom, where the water that she ships, or which leaks in, remains, and is called "bilge-water."

Binnacle. — A box, fitted with lights, which contains the steering-compass.

Berth. — An anchorage; a bunk or wooden shelf used for sleeping in.

Bitts. — Large, upright pieces of timber, with a cross-piece, to which hawsers or large ropes are belayed; also called "knight-heads."

Blocks. — Instruments, with sheaves or pulleys, used to increase the power of ropes.

Block and Block (also called commonly "chock-a-block"). — When the two blocks of a tackle have been brought as near together as possible.

To Make a Board. — To tack.

To Make a Stern-Board. — To move through the water stern foremost.

Bob-Stays. — Ropes from the cut-water, or stem, to the bowsprit end, to sustain and strengthen it.

Bolt-Ropes. — Ropes sewn round the edges of the sails, to keep them from splitting.

Booms. — Round pieces of timber on which the foot of sails are lashed.

Bows. — The round part of the yacht forward, ending in the cut-water, or stem.

To Bouse. — To haul upon.

Bowsprit. — A spar nearly parallel with the deck, extending out over the stem.

To Bring Up. — To take the bottom suddenly, as brought up by a shoal; to come to an anchor.

To Bring To. — To make the yacht nearly stationary by stopping her headway by means of the sails set in different positions, so as to counterpoise each other in connection with the helm.

Butt End. — The end of a plank in a yacht's side; to start a butt, i.e., to leak.

By the Board. — A mast is said to go by the board when carried away just above the deck.

By the Head. — When a yacht is deeper in the water forward than aft.

By the Stern. — The reverse of "by the head."

By the Wind. — When a yacht is as near the wind as she can be sailed without the sails shaking; also called "full and by."

Cable. — The rope by which the yacht is secured to the anchor.

To Pay out the Cable. — To allow more of it to pass outboard, so that the yacht lies farther from the anchor.

Caboose. — Place where the food is cooked; also called the "cook's galley."

Call. — A silver whistle used by the boatswain to have certain orders obeyed.

CAPSIZE. — To turn over.

TO CARRY AWAY. — A spar is said to be carried away when it is broken by the wind.

TO CAST OFF. — To untie, to allow to go free; viz., "Cast off the main-sheet!" "Cast off that boat's painter!"

CASTING. — To pay a yacht off on the desired tack when weighing the anchor, by arranging the sails so as to be taken aback.

CAT BOAT-RIG. — A yacht rigged with one mast placed chock forward in the eyes, and without stays or bowsprit, and fitted with one fore-and-aft sail.

CAT'S-PAW. — A light breeze or puff of air seen upon the water.

TO CALK. — To drive oakum or cotton into the seams to prevent leaking, and to "pay" the same with pitch or tar.

CENTRE-BOARD. — A movable keel that can be lowered or hoisted at pleasure.

TO CLAW OFF. — To beat to windward from off a lee-shore.

CLEAT. — A piece of wood with two horns, fastened to the side of the yacht or to the mast, upon which ropes are made fast.

CLEWS. — The corners of sails.

CLOSE-HAULED. — To sail as near the wind as possible.

COILING. — To gather up a rope into a circular form ready for running out again at a moment's

notice; such as, "Coil up the peak-halliards, and have them ready for running!"

COURSE. — The point of the compass on which the yacht sails.

CROSS-BEARINGS. — The finding of the exact position of the yacht upon the chart by taking the bearings by compass of two objects on shore.

CROTCH. — Two crossed pieces of wood in which the main boom is lashed, when the yacht is at anchor or the sail furled, to confine it in place.

TO CUN. — To direct the helmsman how to steer.

CUT-WATER. — The timber forming the entrance of the yacht.

BOAT-DAVITS. — Pieces of strong, bent iron standing out over the side to hoist boats up to, and secure them.

DOWNHAUL. — A rope used to pull down the jib, &c.

DRAUGHT. — Depth of water. Thus it is said of a yacht that her draught is three feet; i.e., she draws three feet of water.

DRIFT. — To drive to leeward; to lose steerage way for want of wind.

EARINGS. — Small ropes used for lashings.

EASE OFF. — To slacken.

EASE OFF HANDSOMELY. — To slacken very carefully.

END FOR END. — To change a rope that has been worn, and use one part where the other was formerly used.

End On. — To advance bow or stern on, or to have another vessel approach in a similar manner.

Ensign. — The national flag, carried always at the gaff-end.

Fag-End. — The end of a rope which is frayed.

Falling Off. — When a yacht moves from the wind farther than she ought.

Fathom. — A measurement six feet in length.

Fid. — A tapered piece of wood used to splice ropes with, and, when made of iron, called a "marline-spike."

To Fill. — To have the wind strike the inner or after surfaces of the sails.

Flake. — One circle of a coil of rope.

Flukes. — The broad spade-like parts of an anchor.

Fore. — That part of the yacht nearest to the head.

Fore and Aft. — In the direction of the keel; also vessels without square yards. Hence a schooner is often called a "fore-and-after;" and a ship, a "square-rigger."

Foul Hawse. — When the cables are twisted.

To Foul. — To entangle a rope; as, "The jib-halliards are foul. To run foul of a yacht is to come in collision with another.

To Founder. — To sink.

Furling. — Making the sails fast to the booms and spars, and stowing them, by means of gaskets.

GAFF. — The spar that supports the head of a fore-and-aft sail.

GANGWAY. — The place where persons come on board.

GASKET. — A piece of rope or narrow canvas used to tie up sails with, or lash any thing.

TO GO ABOUT. — To tack.

GORING. — Cutting a sail obliquely.

GRANNY-KNOT. — A foul knot, — one not tied in a proper manner.

GRIPING. — When a yacht carries too great a weather-helm.

HALLIARDS. — Ropes or pulleys to hoist up sails.

HANDS. — The crew; i.e., "Send a hand aft here!" "All hands," all the crew. To "hand a sail," to furl it. "Bear a hand," hurry up to help. Hand lead, instrument used for sounding.

HANDSOMELY. — Carefully.

HANKS. — Oval rings, fitted to work upon stays, to which the sail is lashed to be hoisted or lowered.

HATCHWAY. — A square hole in the deck that communicates with the hold.

TO HAUL. — To pull.

TO HAIL. — To call out to another ship; such as "What ship is that?"

TO HEEL. — To incline to one side; i.e., she heels over too much on account of a want of ballast.

HELM. — A tiller or wheel which controls the rudder.

To Haul Home. — To pull the clew of any sail as far as it will go.

Too High. — The warning given to the helmsman when the yacht is too near the wind.

To Hitch. — To make fast.

The Hold. — The space under deck.

Hull. — The body of a yacht.

"In Irons." — A yacht is said to be "in irons" when she has lost steerage way from any cause, and will not obey the helm.

Jack-Stay. — A small bar of iron, or slat of wood, fastened to a spar, and to which the sail is bent.

To Jam. — A knot is said to be jammed when it cannot be untied.

Junk. — Old pieces of rope, canvas, &c.

Jury-Masts. — Temporary masts used when others are carried away.

Jibing. — The act of passing the main-boom from one side of the yacht to the other, whilst running before the wind.

Keel. — That part of the yacht lowest in the water, and upon which all her superstructure is erected.

Kink. — A twist or turn in the rope.

To Labor. — A yacht is said to labor when she pitches and rolls heavily in a sea-way.

Land-Fall. — Discovering the land.

Larboard. — The left side of the yacht, facing forward, now almost obsolete, *port* having almost

wholly taken its place; larboard having been found in practice to be too near in sound to its opposite starboard.

LAY AFT. — The command to come aft. "Lay alŏft," to go up the rigging. "Lay out," to go out, on the bowsprit, for instance. "Lay in," to come in."

LEACH. — The perpendicular border of a fore-and-aft sail.

LEE-LURCH. — When the yacht rolls heavily and suddenly to leeward.

LEE-SHORE. — The coast-line to leeward of the yacht, on which the wind is blowing.

LEEWARD. — The direction towards which the wind is blowing.

LONG LEG. — A term used when the wind is not dead ahead, but so as to cause the yacht to make a long tack and a short one. Hence, to make "a long leg," and a short leg.

LOG. — The record of the yacht's performance each day of twenty-four hours, as concerns weather, courses, &c., kept in a log-book. "Heaving the log," to ascertain the speed by means of a log-line.

LOOMING. — The appearance of a distant object, such as another vessel, or the land, especially in foggy or misty weather, when it is said to loom, i.e., look larger, and appear nearer, than it really is.

LUBBER. — A person who is not a sailor, — a greenhorn.

LUFF. — An order to have the helmsman put the helm to leeward; the forward part of a fore-and-aft sail attached to the mast by hoops.

LYING TO. — Bringing the yacht to the wind under small sail, and lashing the helm a-lee, so that she may lie safely, and ride out the storm.

TO MOOR. — To secure the yacht by more than one anchor.

MOORINGS. — The place where the yacht is generally kept when in harbor, and denoted by a buoy, which watches over them.

NEAP-TIDES. — Those tides which occur when the moon is in her quarters; spring-tides being much higher, and occurring at the full and change.

TOO NEAR. — A warning to the helmsman that the sails are not quite full, and that he is steering a little too near the wind.

MAIN CHAINS. — Place on the yacht's side where the shrouds and backstays are fastened.

MISS-STAYS. — The act of failing to "go about" on the other tack.

MODEL. — The shape and form of the hull.

OFF AND ON. — Approaching the land on one tack, and leaving it on the other.

OFFING. — Out to sea, clear of all dangers, yet near the land; sea-room.

OVERBOARD. — Out of the yacht; in the water.

OVERHAULING. — To haul a rope through a block; to examine any thing thoroughly; to gain upon a vessel or object ahead.

PAINTER. — A short rope in the bows of a boat by which she is secured.

TO PART. — To tear asunder; i.e., the cable has parted; the main-sheet has parted.

TO PASS A LASHING. — To wind a rope round a spar or sail.

PAY. — To rub on pitch or tar with a large brush.

TO PAY OFF. — To make a yacht's head recede from the wind by hauling the jib to windward, and easing off the main-boom to leeward.

TO PEAK UP. — To elevate the outer or after end of a gaff, so that the sail may set better.

PLYING. — Turning to windward.

POOPING. — A yacht is said to be pooped when she is struck by a sea that comes on board over the stern or quarter.

PORT. — *See* larboard.

PREVENTER. — Any thing to secure or take off the strain, as preventer jib-sheet.

PENNANT. — A long narrow flag.

QUARTER. — That part of the yacht's side contained between the beam and stern.

RAKE. — The sheer of masts from the perpendicular.

RANGE OF CABLE. — A sufficient length overhauled and ready so as to allow the anchor to reach the bottom without fouling.

TO REEF. — To reduce a sail by fastening it down to a boom or jack-stay by means of reef-points.

To Reeve. — To pass a rope through a block.

To Ride. — To be held at anchor.

To Right. — A yacht is said to right when she rises to an upright position again, after having been thrown on her beam-ends by a sudden squall.

To Right the Helm. — To put it amidships, so that the rudder will be in a line with the keel.

To Run Down. — When one yacht sinks another by running over her.

Scant. — The wind is said to be scant when a yacht will barely lay her course.

Scope. — To pay out more of the cable when at anchor.

To Scud. — To run before the wind in a storm.

To Scuttle. — To make holes in a yacht's bottom to sink her.

To Serve. — To wind any thing round a rope so as to save it from chafing.

To Seize. — To make fast or bind.

To Sheer. — To vary to the right and left from a direct course.

To Ship. — To place or receive any thing on board; as, to ship a sea, to ship a crew.

To Shiver. — To make the sails shake in the wind's eye.

Shoal. — The land beneath the water that approaches near the surface, or is left bare at low water.

The Slack of a Rope. — The part that hangs loose.

To Slip a Cable. — To let it run out overboard, and release the yacht from the anchor, being first generally buoyed so as to be recovered.

To Slue. — To turn any thing about.

Snub. — Used in reference to the cables, in checking the yacht, after they have been paid out.

To Sound. — To ascertain the depth of water by means of a lead-line.

To Take a Spell. — To relieve any one at any duty; as, to take a spell at the wheel.

To Spill. — To take the wind out of a sail by easing off the sheets or otherwise, so as to remove the pressure of the wind.

To Splice. — To join two ropes together by interweaving the strands.

To Spring a Mast. — To crack or split it.

A Spring. — A rope made fast to the cable, and taken on board aft, in order to haul the yacht's side in any direction.

Spring-Tides. — The highest tides, which occur at the full and change of the moon.

To Stand On. — To keep on in one's course.

To Stand By. — To be ready.

Starboard. — The right side of a yacht, the observer looking from aft forward.

To Steer. — To control the yacht with the rudder and tiller.

Stranded. — A yacht is said to be stranded when she is so far on shore that she cannot be floated.

To Strike. — To beat against the bottom; to hit suddenly any object below the surface of the water.

Swig Off. — To take a turn with a rope at a cleat, and then pull upon it laterally, so as to gather in all the slack.

To Tack. — To advance by a series of angles toward the direction from which the wind proceeds.

Taut. — Tight.

Taunt. — Long, lofty.

Tender. — A small boat or wherry used to pass from the yacht to the shore.

To Tow. — To drag any thing astern behind the yacht; as, to tow the tender.

Truck. — The small ball at the topmasthead, through which the signal-halliards reeve.

Trough of the Sea. — The level of the water between two waves.

Turning to Windward. — Tacking.

Unbend. — To cast off, to release; as, "Unbend the anchor from the cable!" "Unbend the mainsail!" — roll it up and put it below.

To Unship. — To take any thing from the place where it was fixed; as, to "unship the rudder."

Wake. — The track, or furrow, left by the yacht on the water she has passed over.

To Wear. — To turn a yacht round *from* the wind, — the direct opposite of tacking.

To Warp. — To move a yacht by hawsers.

Watch. — A division of the crew into starboard and larboard watch, who take turns in taking care of the yacht.

Water-Logged. — The condition of a yacht when she is so full of water as to be almost unmanageable, and nearly submerged.

Way. — Progress through the water: "she has good way on." To a boat's crew, to cease pulling, the command is given, "Way enough."

To Weather a Yacht. — To get to the windward side by faster speed, or lying nearer the wind.

Weather Beaten. — Worn by the weather and exposure.

Well of All. — A command used when the several ropes of a sail have all been hauled upon at the same time, and it is perfectly set, and means to belay.

To Weigh. — To lift an anchor from the bottom.

Wind's Eye. — The exact direction from which the wind proceeds.

To Windward. — Towards that point from which the wind blows.

To Work to Windward. — To tack so as to make progress in the direction from which the wind blows.

YACHT. — A vessel used for pleasure only, and not for commerce or trade; built for speed and comfort.

TO YAW. — To swerve suddenly and violently from the true course, in spite of the action of the rudder.

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